THE DENTAL PRACTITIONER

monthly journal for the Practitioner and his Staff

VOL. IV, NO. 2 OCTOBER, 1953

Incorporating the Official Supplement of
The Dental Laboratories Section of the Surgical Instrument Manufacturers' Association

CONTENTS

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A Monthly Journal for the Practitioner and his Staff

(Incorporating the Proceedings of the British Society of Periodontology and the Official Supplement of the S.I.M.A.—Dental Laboratories Section)

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THE
DENTAL PRACTITIONER
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ITORIAL

GOLD INLAYS

With the introduction of gold casting to the dental profession by William Taggart in 1907 a major revolution occurred in restorative dentistry. As always with something new, there was opposition, in the same way that there was against amalgam in an earlier decade. The first gold inlays were scathingly described as islands of gold in seas of cement. The process of casting was to change more rapidly than the old amalgam, until to-day when highly accurate gold inlays are made. Although it may be said that if an inlay does not fit then look first to the cavity, this can only apply if a controlled method of fabricating the inlay is used. It is the long line of research into methods of controlling the waxes and investing material that has made the modern method of casting possible. Although casting from a wax impression has been known for centuries, it is the precision investing casting process that is of recent origin. To-day's industrial precision castings in all their intricacy owe their development to the early pioneers of dental casting.

Gold is the premier dental material, and the gold inlay has practically replaced the gold foil, but this does not necessarily mean that it should replace other materials. It has its place in restorative dentistry in the same way that amalgam has its own place. Its one disadvantage is its colour, for æsthetics has an important part in dentistry. Its assessment must be made on its use in the correct sphere, and when this is done it is the perfect material. A good amalgam is better than a bad gold inlay, but in bridgework and certain types of cavity such as the Class IV, gold becomes the only possible material. It requires a precise technique and a knowledge of the materials in use if full benefit is to be obtained. The articles produced in this issue should aid every practitioner, for they cover the three phases of inlay technique—the cavity preparation, the wax pattern, and the casting. The articles have been specially written for us by members of the staff of the Dental School at the University of Minnesota. This school has a recognized high standard of gold work, both in practice and research, and we more than appreciate their efforts in producing these articles.

Our thanks are due to the Dean and members of his staff, and also to Dr. Walter Hyde, the Editor of *North-Western Dentistry*, who kindly made all the arrangements.

THE UNIVERSITY OF MINNESOTA SCHOOL OF DENTISTRY

THE School of Dentistry of the University of Minnesota was organized in 1888. Prior to that time there was a Dental Department in the Minnesota Hospital College, a medical school formed by a union with the St. Paul Medical College in 1881. Dr. W. X. Sudduth served as the first Dean of the Dental School until 1895. He was succeeded by Dr. Thomas E. Weeks, who held the deanship until 1902. Dr. W. P. Dickinson became the next head of the Dental School and served until 1905, when Dr. Alfred Owre was appointed dean. Great progress was made in dental education during Dean Owre's administration and the College, whose building now bears his name, won a place among the leading dental schools of the world, a position it has maintained since that time. Dr. Owre resigned as dean in 1927, leaving a school well impregnated with his idealism, which has been handed down through the faculties to the students ever since. Dr. Wm. F. Lasby served as the dean of the college until the appointment of the present dean, Dr. Wm. H. Crawford, in 1945.

Curriculum and entrance requirements have grown steadily since the beginning of the College. Three years of dental training were in effect until 1903, with entrance requirements ranging from no prescribed schooling other than an examination in high school subjects. In 1903 the entrance requirements had risen to two years of high school and the dental course was increased to four years. To-day we have a prescribed minimum two-year course prerequisite to entrance in the dental school. Dental school courses, too, have increased in number and magnitude, creating space problems in the once commodious Owre Hall.

During Dean Crawford's administration, completely equipped new clinics have been built for the pedodontia and orthodontia departments to help ease the growing pains. A new endodontia clinic has been completely equipped for the department of operative dentistry. A new photography laboratory and a full-time photographer are now available to the staff for making movies, slides, photomicrographs, or any other visual aids necessary for their teaching or research. Laboratories have been established and equipment and personnel made available to facilitate research. Student laboratory and clinical facilities are constantly being improved to keep up with the ever advancing science of dentistry, producing graduates well trained to take their place in the profession.

SOME FUNDAMENTALS OF INLAY CAVITY PREPARATION

By **ROBERT E. SAUSEN**, D.D.S. (Saint Paul, Minnesota)

The School of Dentistry, University of Minnesota

A REMARK was passed at a recent post-graduate course that an inlay is not difficult to make at all—if a good cavity preparation is first established. Though this statement is not entirely true, yet it illustrates the fundamental importance of starting a good inlay right—with the cavity form. Even the best of cavities will not reduce the exacting care required in manipulating wax, investments, and gold. These materials in themselves are subject to the most scientific application and can be considered independent of the cavity. Yet it must be admitted that neither these materials nor any others can correct or compensate for an ill-fashioned cavity. This brings us to a fuller consideration of the real usefulness of a good cavity preparation. Our cavity must be so designed as to anticipate the

preservation of remaining tooth structure and a permanent restoration of all lost structure. Accordingly, our preparation must be based on principles which consider both tooth morphology and function, and also the techniques by which the lost tooth structure is to be replaced. Proper removal of caries and weakened structure, extension for prevention, outline form, resistance form, retention form, and mechanical stability of the restoration are all basically important considerations. These points are also features of any type of cavity preparation, and are therefore familiar to most students of operative dentistry.

Our outline form is the location of the cavosurface angle, and this defines the boundary of the restoration. Its extension into self-cleansing areas of tooth surface is one of the oldest principles of cavity form. The experience of the operator is called upon in each case to determine how well æsthetics and preservation of structural strength will limit or compromise this extension. Certainly it should be extended sufficiently far to allow proper finishing of wax and gold margins.

Most typical of inlay cavity preparations is the absence of all undercuts with respect to one line of withdrawal. The axis of this line should be parallel to the line of the most common stress applied to the inlay, as far as possible. It should be possible to sight along this line into the cavity and be able to see every detail of its form—the walls, line angles, and point angles. Yet this lack of undercuts can be overdone. In obtaining our free line of withdrawal we must not sacrifice sharp, definite line angles at the base of the cavity, nor should the walls be flared back. Rather these walls should be close to parallel, thus providing some retention form and assuring stability of the restoration. (*Fig.* 1.)

We may never rely upon our cementing media to provide any permanent resistance form or retention for the inlay. The cement should only be regarded as a sealer. Though it does add some frictional resistance to inlay displacement along the walls, this should only be incidental and supplemental to other retention forms such as pins, spurs, and dove-tails. These features will lock the inlay into the cavity in every direction except that of withdrawal. If undercuts in the cavity cannot be eliminated by further extension of the cavity, then these may be cared for by placing cement at these points. It is poor practice to allow some caries to remain temporarily, simply to facilitate withdrawal of a wax pattern. No cavity is ready for its wax pattern until all caries is removed, since it is extremely important to know its proximity to the pulp or how much enamel it may undermine. The final disposition of a tooth can be judged only after all pathology has been eliminated.

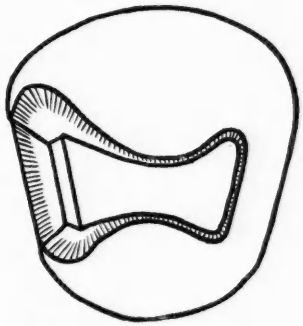

Fig. 1.—Occlusal aspect of a mesio-occlusal preparation in an upper second bicuspid.

The most common placement of an inlay is in the restoration of two or more surfaces of posterior teeth. Since the simple occlusal and the compound cavities have so much in common, both can be discussed in detail simultaneously. Obtaining access to the cavity can be quickly accomplished with carbide burs or diamond stones in the initial cut on the occlusal surface. The final occlusal depth of the cavity can be established in the same movement. There is no exception to the rule that this depth must leave no enamel on the pulpal floor and no vestige of the fissures must remain. (*Fig.* 2.) The floor should be flat and in a plane which is perpendicular to the long axis of the tooth. The resultant box form may be as deep and angular as we would prepare it for an amalgam restoration. For many years an even more empirical rule has been followed. This stipulates that the cavity depth under cusp ridges is such that the dentine wall is at

least one-fourth as long as the enamel wall. We need not adhere to this rule too rigidly, but nevertheless it serves as a good reference point.

Our initial carbide or diamond cut is continued until one or both of the marginal ridges to be restored is undercut. However, the approach to a marginal ridge must be conservative and provide a definite slant to the

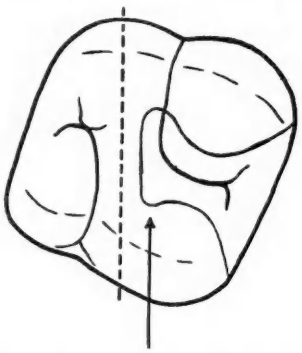

Fig. 2.—Occlusal aspect of a mesio-occlusal preparation in an upper molar.

wall if this ridge is to be left intact. The final cavo-surface margin is best left on the inner slope of the ridge rather than on its crest. The same applies to the cusps, of course. Here the cavo-surface margin should not extend beyond a point halfway between the central groove and the tip of the cusp, if this is possible. On the other hand, extension into occlusal grooves is more radical, bringing an extension from the original depth of the cavity completely through the groove. This eliminates its fissure and leaves the occlusal margin at a shallow sulcus, which is more easily finished in gold. Entrance into these grooves need not show a wide approach. Use of a 701 tapering bur is sufficient for the purpose in most cases. This leaves a curved occlusal outline in which the radius of curvature is small in the grooves and wide about the cusps. The occlusal preparation may be brought nearly to completion before beginning any work on the proximal. Thus this portion can be finished free of hæmorrhage or saliva and affords good access and vision into the proximal preparation.

The technique of undermining the proximal plate of enamel and then fracturing this plate away from the buccal and lingual sides is a good approach. This eliminates a large block of enamel quickly and avoids contact of instruments with the adjacent tooth and the interproximal tissue. The interdental papilla is mutilated by operative procedures too often, and its state of preservation often indicates the degree of skill exercised by the operator in this region.

Having opened up the proximal we can now determine the final extension of its margins. A deep recession of investing tissues beyond the anatomical cervical line need not be pursued unless caries or other pathology has already deteriorated this surface. In cases of normal tissue height our gingival margin should be covered by a portion of this soft tissue. The minimum extension is certainly beyond contact with the adjacent tooth. This extension can be certified by passing the tine of a 5 SSW explorer apical to the gingival margin. If drawn occlusally, it should easily pass the space between the gingival margin and the adjacent tooth. Such a test will not be possible, though, until the buccal and lingual walls are also sufficiently extended. It is best to bring these walls out properly at the gingival angles first. Their subsequent divergence toward the occlusal will carry the remainder of the margins to a proper extension. When completed it will be possible to insert a paper disk flat against the proximal buccal and lingual walls for polishing. This usually assures their location in a self-cleansing area and where gold margins can be finished. Further extension is unnecessary except to continue removal of undermined enamel.

Some operators like to round off the axiopulpal line angle at the neck of the cavity, giving this angle a definite curvature. The elimination of this sharp angle is largely intended to reduce the possibility of a bubble collecting there during the process of investing the wax pattern. It is also proposed that the formation of a rounded joint improves the resistance of the wax pattern to distortion at this point. Whether such strength should be a practical necessity is open to question, but

the effort to obtain it should be commended. This rounded angle may allow the wax to flow more freely toward the gingival seat. Actually the bulk of wax presented to the cavity should be so shaped as to reach the gingival seat first. The ease of this step is facilitated by sufficient mesial-distal width to the proximal preparation so that a workable volume of wax can be admitted. We have attempted to define this width at the gingival seat as equal to the diameter of a No. 3 Black's amalgam plugger. This dimension can be applied for all posterior teeth generally, taking exception to lower bicuspids if these teeth seem too small.

All gingival seats should be cut so that their plane is directly perpendicular to the long axis of the tooth, thus accounting for some of the resistance form for the inlay. The seat is finished with a 45° bevel on the enamel rods, a task for which gingival margin trimmers are well designed. When only two surfaces are being restored, a reverse 45° bevel is also cut at the gingival axial line angle (*Fig.* 3). This can serve several purposes, but principally it acts as a channel to guide the casting to place tightly against the axial wall. Both bevels must be sharp and definite enough for a good impression in the wax pattern. If they happen to join to form an inverted-V gingival seat, this is of little consequence.

Opinions are expressed in the literature occasionally to assert that a slightly rough cavity wall is preferable because this type of surface is bound more tenaciously by the cementing media. Though such a rationalization is true, this factor should not be depended upon for permanent inlay retention; and, unfortunately, such a policy may only tend to detract from consistently neat cavity preparation. A good adaptation of wax to the cavity walls may be jeopardized by withdrawal of the pattern across an irregular surface. The cavity walls should have a smooth finish and allow an easy withdrawal of the pattern. Proximal walls can be finished with medium garnet and coarse cuttle-paper disks, as mentioned before. Occlusal walls may be finished with a light sweeping action of a fast-rotating fissure bur; or a tapering stone is equally useful if its abrasive is not too coarse or if it is not eccentric in its construction. Some areas must be planed with a hatchet or chisel until all walls are smooth and are limited at the cavity base by definite line angles.

When the conventional cavity outline is established or when all caries and undermined enamel have been eliminated, any dangerously weakened cusps may then be considered for restoration. The reduction of a cusp should remove its occlusal enamel and follow the general outline of the original cusp. At least 1·5 mm. thickness of gold is provided for, though more is often necessary. Regardless of thickness, the display of gold across a buccal or labial surface should be uniform. A slight bevel in enamel is placed on the cavo-surface angle, rendering a good margin for finishing gold. If a deep developmental groove separates the cusps, the occlusal reduction is continued beyond this groove and slightly into the next cusp. A step form on to the buccal or lingual surface may be necessary to reach the termination of the groove. *Fig.* 4 shows the treatment of the mesial groove on a lower first bicuspid in which the lingual cusp is being restored. Extension into the mesiolingual groove is kept as far lingually as possible, avoiding the contact point. Fortunately this embrasure is wide enough to allow access for finishing and cleansing of the buccal margin.

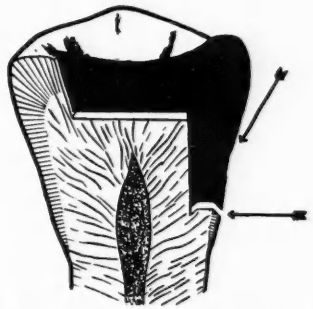

Fig. 3.—Cross-section showing gingival bevel and acute angle.

The gingival or Class 5 (Black's classification) inlay is not often indicated because amalgam and gold foil remain the materials of choice for these surfaces. Yet there is no

better protection to a tooth than that provided by a hard cast gold when this tooth is to support a denture clasp. The gingival inlay has several special indications and can serve

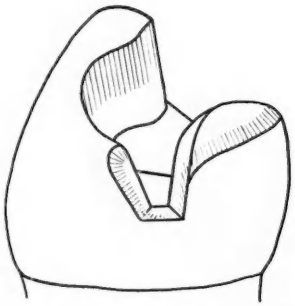

Fig. 4.—Disto-occlusal preparation in lower first bicuspid, restoring lingual cusp and extending into mesiolingual groove. Mesial aspect.

many useful years if correctly handled. Its largest disadvantage is the difficulty to obtain good resistance form—a consequence of the necessary wide divergence of cavity walls. These walls may be cut parallel to the cleavage lines of enamel, exactly as one would do for

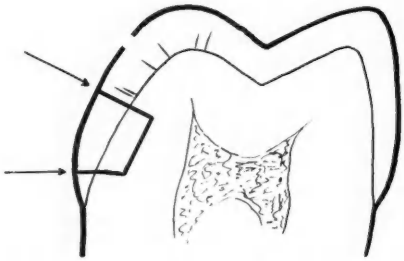

Fig. 5.—Section of molar showing gingival cavity preparation.

amalgam, and they are extended below gingival tissue and sufficiently far elsewhere to end in sound tooth structure (*Fig.* 5). A short cavo-surface bevel is not needed for this preparation. The lack of resistance form makes both wax pattern and gold casting rather unstable and awkward to manipulate in the cavity. Occasionally, then, it will be necessary to construct the inlay by indirect techniques, but some benefit is obtained by placing pin holes in the axial wall. *Fig.* 6 illustrates the size and depth of these pins, created with a 700 tapering bur. They should be placed as far mesially or distally as possible without undermining proximal enamel, thus avoiding proximity to the pulp. The round hole may be modified to an oval outline for greater strength, if needed. *Fig.* 6 also demonstrates two other important fundamentals. Observe that the axial wall presents a curvature which follows the outline of the tooth surface. A flat plane between the mesial and distal line angles would place the centre of the cavity quite deep. Cavity depth, to repeat, must always penetrate enamel. This

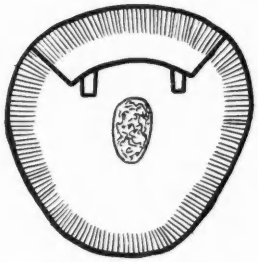

Fig. 6.—Cross-section showing pin holes.

point can be missed on the buccal surface of lower molars where enamel rods are relatively very long.

The perfection of cavity detail is nowhere more exactingly required and appreciated than in anterior inlay work. A cavity with large lingual access or with an involvement of the incisal angle usually requires an inlay restoration. If previous destruction has not progressed too far, the labial inlay margin can be conservatively cut and beautifully finished, producing a very satisfactory æsthetic appearance. Extension to the incisal should proceed past the contact point (exception taken in lower anteriors) and lingually will require removal of the involved marginal ridge for all types of upper proximal inlays. There are three general types of cavities used, and these can be described according to the form given them: (1) The simple proximal with straight lingual (maxillary teeth) or labial (mandibular) access; (2) The dove-tail preparation; and (3) The

proximo-incisal or staple type preparation. The latter two typically involve the removal of part or all of the incisal angle.

Fig. 7 shows the features of the single proximal type. It is obvious that this preparation is indicated only when the incisal angle is strong and there is sufficient dentine to cut the incisal groove. This cavity requires removal of the marginal ridge from which a slot-type preparation proceeds to the labial. It can be entirely prepared with tapering fissure burs and chisel-type hand instruments.

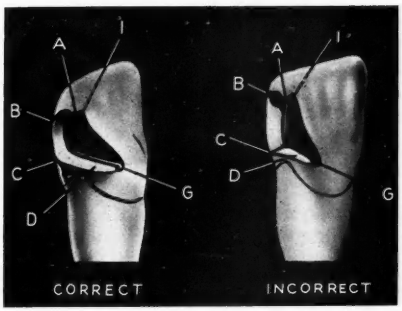

Fig. 7.—Correct and incorrect preparations of the simple proximal inlay cavity.

The opposing incisal and gingival grooves are formed in dentine with a 700 bur just deep enough to create a definite lock, usually no deeper than the thickness of the bur. They must not reach the dento-enamel junction under the labial plate, and as they project out on to the lingual surface they will diverge only slightly. Notice that the labial wall has a smooth sweeping curvature. The angle at C must not produce an undercut to the lingual and the angle at B should not weaken the incisal angle. This incisal angle is very carefully bevelled. If this becomes too weak, a dove-tail preparation will be necessary.

Since the dove-tail form of inlay is the best known restoration for the distal surface of an upper cuspid, such a preparation is shown in *Fig.* 8. The proximal box form is best prepared first, since the lingual dove-tail must be alined with it. The gingival seat is cut flat and its mesiodistal width should be equal to the diameter of a 558 fissure bur. Such a width will allow good cavo-surface and reverse bevels to be placed (not shown in the sketch). The direction of the axial line angles indicates that this inlay will withdraw linguo-incisally.

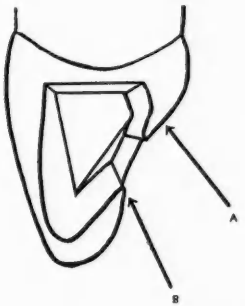

Fig. 8.—Proximal aspect of disto-lingual preparation in an upper cuspid.

Additional resistance form is given by making an acute angle in the gingival third of the labio-axial line angle. In most cases the lingual dove-tail can be terminated on the crest of the lingual developmental ridge, but extensive caries may require more lingual preparation. Both outlines may be seen in *Fig.* 9. The entire lingual outline is located midway between the cingulum and the cusp point, as G. V. Black originally advocated many years ago.

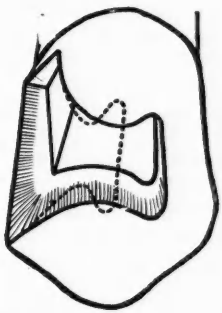

Fig. 9.—Lingual aspect of disto-lingual preparation in upper cuspid, showing two positions for terminating dove-tail.

Observe how the labial wall on the dove-tail neck sweeps across to the proximal margin

in nearly a straight line. This continuity of bulk tends to prevent lateral displacement from the lingual stresses applied. The floor of the dove-tail is kept in dentine and parallel to the lingual surface of the tooth. The lingual enamel rods should be given a long bevel to resist the heavy lingual stresses they receive. Accordingly, the gingival wall of the dove-tail is cut beyond a line parallel with the cleavage lines of enamel. The labial wall is given a long bevel when it is cut to draw with the linguo-proximal wall, as indicated by letters A and B in *Fig.* 8.

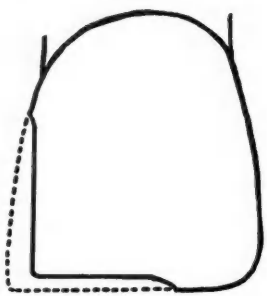

Fig. 10.—Labial aspect of a proximo-incisal preparation in an upper central.

The proximo-incisal inlay is more typical for central and lateral incisors. These preparations assume an L-shaped outline, of which the labial aspect is shown in *Fig.* 10, with the incisal extension being taken at least two-thirds across to the opposite side—or where the developmental lobes coalesce. For upper anteriors more extensive cutting is done on the lingual, and oppositely for lower anteriors, to resist the typical stresses of articulation. Of course the remaining plate of enamel must be well supported with dentine. A short pin form is used for incisal retention. This should be accurately placed with a 700 tapering bur which is positioned at the far end of the incisal step and is directed in a line parallel to the incisal third of the labial surface. A better wax impression of this hole is obtained if it is widened mesiodistally to an oval outline. Its depth is adequate at 1·5 mm. A longer pin not only approximates the pulp horns too closely, but it is more easily distorted. A very accurate and full impression of this pin hole is important if it will be used to maximum advantage. The proximal portion is prepared with a conventional box-type resistance form as drawn in *Fig.* 11.

In selected cases the proximal preparation may be finished with a slice type cavity; however, these modifications will not be elaborated in this paper. Many important related details, such as clinical indications and step-by-step instrumentation, have been omitted in the interests of brevity. The purpose here has been to review some of the fundaments which are most commonly required in inlays throughout the mouth. Those special changes required in the wide variety of clinical cases, which every operator sees, have usually been resolved by the pertinent adaptability for which our profession is renowned.

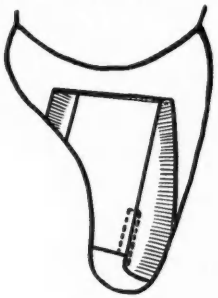

Fig. 11.—Proximal view of a proximo-incisal cavity in an upper central.

(All illustrations are taken from Robert O. Green's *A Clinical Manual of Operative Dentistry*, Dubuque, Iowa: William C. Brown Co., 1948; by the Division of Operative Dentistry. University of Minnesota.)

BIBLIOGRAPHY

BLACK, G. V. (1936), *Operative Dentistry*, 137–165. Chicago: Medico-Dental Publishing Co.

BROWN, R. K. (1938), *J. Amer. dent. Ass.*, **25**, 1974.

HOLLENBACK, G. M. (1943), *Ibid.*, **30**, 99.

MCGEHEE, W. H., and others (1950), *Operative Dentistry*, 490–495. Philadelphia: Blakiston Co.

THOM, L. W., and SIMON, W. J. (1942), *Minneap. Dist. dent. J.*, December.

UNDERWOOD, N., and CHUMBLEY, C. C. (1941), *J. Amer. dent. Ass.*, **28**, 247.

VOLLAND, R. H. (1920), *Ibid.*, **7**, 479.

WAX PATTERN TECHNIQUE FOR INLAYS

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THERE is no "most important step" in the fabrication of an inlay for the restoration of lost tooth structure. From the cavity preparation to the finished restoration, all phases of this work depend on a thorough knowledge of the technique and materials used. Also, there is no one correct technique that must be used to produce a good restoration. Certainly fundamental principles must be adhered to throughout, but there are many variations of each individual phase in the construction of cast-gold restorations that are advocated by different groups of operators, all with apparent success. So it is with wax pattern techniques.

Regardless of method, the making of an accurate wax pattern depends on an understanding of the physical properties and manipulative characteristics of the material used. Although the exact composition of the inlay casting waxes in clinical use to-day is a commercial secret, they should be compounded to meet the specifications established by the Bureau of Standards. They have recommended that such a wax should soften and remain plastic at a temperature comfortable to the oral tissues until it can be forced into all of the details of the cavity preparation. It should harden sufficiently at mouth temperature to permit carving without flaking or chipping. It should maintain a consistency that will permit withdrawal from the cavity without distortion, retaining margins, contacts, and anatomical form until they can be incorporated in the investment. The colour should contrast the oral tissues to facilitate carving. Finally, it should vaporize at casting temperatures without leaving a residue other than carbon (Green, 1948; Skinner, 1940; Sauder and Paffenbarger, 1942).

With all of the above properties present in the most favourable degrees there is still the factor of shrinkage to be considered. The linear coefficients of thermal expansion for these waxes are higher than any of the other materials used in dentistry (Skinner, 1940). They change approximately 0·04 per cent for each degree F. variation in temperature (Green, 1948). This possible source of error must be recognized in order to minimize, through wax manipulation, the effects of temperature variations on the wax pattern throughout the technique. There is also an elastic property in these waxes that causes them to be unstable when manipulated. This elasticity can be

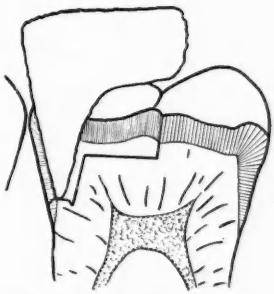


Fig. 1.—Insertion of wax into cavity.

locked by chilling the wax and released by heating slightly above the temperature at which it was manipulated. Distortions from this source can be minimized by manipulating the wax at the highest practicable temperature (Skinner, 1940). Inlay waxes vary from soft to hard, depending on the temperature required to soften them to a workable consistency. The harder waxes are more difficult to manipulate, but are less likely to distort. Three wax pattern techniques are presented here as taught at the University of Minnesota School of Dentistry, using an acceptable hard inlay wax.

THE DIRECT WAX PATTERN TECHNIQUE WITHOUT MATRIX FOR SIMPLE INLAYS

A stick of wax is heated over a flame slowly so that the outside surface does not run or drip. When the wax becomes soft it is kneaded and moulded to the approximate shape of the cavity. This softened wax is broken from the stick and carried to the cavity (*Fig.* 1).

The wax should be shaped so that it will contact the most remote area of the cavity first, ensuring coverage and detail in that part of the preparation. The thumb and finger serve as stops buccally and lingually at the proximal

Fig. 2.—Finger pressure to maintain wax in the cavity.

as the wax is forced to place with occlusal pressure (*Fig.* 2). Pressure is held until the wax has congealed. The gross excess is cut away and the impression removed for inspection. All of the minute details that were incorporated in the cavity preparation must be evident in this impression. At this point

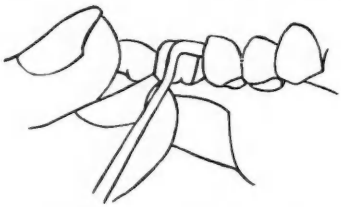


Fig. 3.—Burnishing the wax over the cavity walls.

the impression, through wax shrinkage, is slightly smaller than the cavity. This discrepancy is not compensated for by the heat expansion of the investment. Consequently great care must be exercised in the burnishing of all margins to ensure marginal seal.

The impression is returned to the cavity for carving and marginal correction. The occlusal margins may be burnished with a warm egg-shaped burnisher. The proximal walls and gingival seat are burnished with a suitable wax instrument (a No. 7 Clev-dent, a Walls, or a Hollenbeck carver) (*Fig.* 3). The action of the instrument is always from the wax to the tooth. In instances where the gingival seat is questionable, additional wax is fused to the pattern in that area, the pattern positioned in the cavity, and the margins reburnished. This will ensure sufficient wax coverage in an area that may be lacking through the original wax shrinkage. Many gingival areas do not provide sufficient access for proper burnishing, leaving that margin uncorrected. This results in an inlay with good occlusal and proximal marginal adaptation, but a short gingival seat.

The carving of the pattern is completed, paying particular attention to the proximal contour and contact area. Withdrawal from

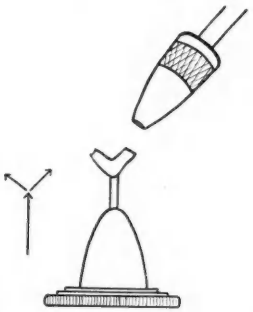


Fig. 4.—Correct position of sprue on wax pattern.

the cavity may be accomplished with the explorer so placed that it will not cause distortion in any part of the pattern during removal. This is usually accomplished by placing the explorer tip in the occlusal just inside the marginal ridge on two-surfaced posterior patterns, and on the proximal just below the contact area on two-surfaced anterior patterns. Class I and V patterns are removed by placing the explorer tip in the centre of the exposed surface. Where possible, the pattern is sprued directly in the mouth and withdrawn on the sprue pin. The pin is attached on the marginal ridge just above the contact area, and so placed to bisect the angle of the two surfaces of the wax pattern (*Fig.* 4). The pattern is then washed with room-temperature water and dried preparatory to investing.

THE DIRECT WAX PATTERN TECHNIQUE WITH MATRIX FOR COMPOUND INLAYS

Although wax patterns can be successfully made for three-surfaced inlays without the aid of a matrix, the confining of the wax at the proximals with such a device facilitates the delivery of softened wax to all of the remote details of the cavity simultaneously. It also enables the operator to apply a sustained pressure on the wax while burnishing the gingival seats.

An ordinary continuous matrix or copper band may be used in this technique. The band is trimmed to eliminate undercuts at the buccal and lingual heights of contour. It should

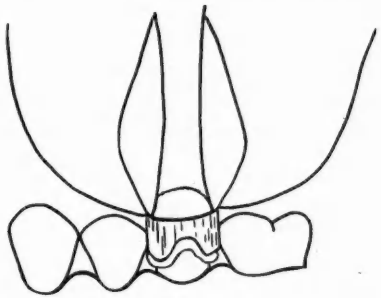


Fig. 5.—Indirect method. Placing the prepared band in position.

extend 1 mm. beyond the gingival border of the preparation, and occlusally enough to permit the carving of marginal ridges. The band should fit loosely to permit sufficient wax coverage over all margins for carving and burnishing.

The prepared band is filled with softened wax. In order to prevent a dragging of the wax along the proximal walls, the areas where the cusps will penetrate the impression are further softened with a warm instrument. Thus the cusps will offer minimal interference when the band and wax are positioned. The filled band is then placed on the tooth and forced into position as shown in *Fig.* 5. The wax is then forced to place by finger pressure on the occlusal and held until congealed (*Fig.* 6). This impression is carefully removed, exerting force only in the direction of withdrawal. Tipping or rocking the impression will cause distortion. Any deficiencies or ill-defined areas must be corrected at this time by fusing additional wax in such areas and re-positioning the pattern on the tooth. The band is then

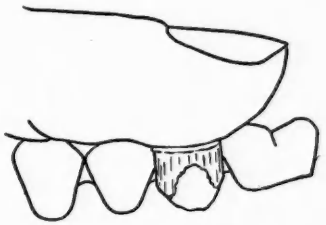


Fig. 6.—Finger pressure holding the band in position.

split with a carborundum disk and removed from the wax. Contact points and proximal contours are corrected by fusing additional wax in these areas when necessary. Burnishing of the margins is again accomplished by using

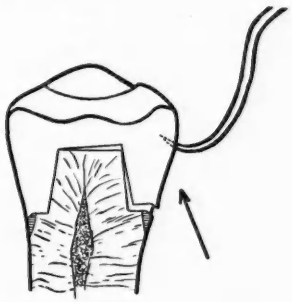


Fig. 7.—Showing distortion due to incorrect placing of probe.

a warm wax carver and working from the wax to the tooth margin. The wax surface may be further finished by burnishing with wetted cotton.

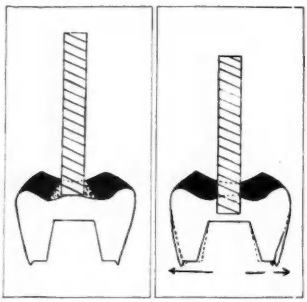
A finished compound pattern cannot be withdrawn from a single proximal surface with the explorer tine without the possibility of distortion (*Fig.* 7). The tine must be inserted in the occlusal surface in order to remove the pattern in the line of withdrawal of both proximal extensions simultaneously (*Fig.* 8). Where convenient, the pattern may

be sprued directly in the mouth, as shown in *Fig.* 9, A. Care must be taken to avoid distortion by forcing the sprue pin into the pattern too far (*Fig.* 9, B).

In patterns that have a greater resistance to withdrawal a gold staple or a gold wire

Fig. 8.—Correct position of probe to withdraw wax pattern.

shaped in the form of a staple may be used to facilitate withdrawal without distortion. The staple ends should be warmed and inserted



A B

Fig. 9.—A, Correct, and B, Incorrect sprueing of pattern.

just inside the marginal ridges of the pattern (*Fig.* 10). The pattern may be sprued and invested with the staple in position. Where a wire handle is used, as in *Fig.* 10, the wire may be trimmed prior to investing, or it may be warmed and removed from the pattern. If left, the wire is easily trimmed from the casting in the finishing of the inlay. The pattern is sprued from a marginal ridge and washed with room temperature water in preparation for investing.

THE INDIRECT-DIRECT WAX PATTERN TECHNIQUE FOR COMPLEX INLAYS

Where inlay cavity preparations involve extensive removal of tooth structure it may be very difficult to make a direct wax pattern and incorporate all of the desirable anatomical

Fig. 10.—Use of wire handle to withdraw pattern.

features in the restoration. In such instances it is much easier to make a die of the tooth and carve the wax pattern out of the mouth, uninhibited by the confining oral structures.

An impression of the preparation is made with compound, using a copper band as a matrix. The band should be relieved for the existing heights of contour and closely adapted at the gingival margins to prevent expressing excess compound in the interproximal area. If compound is permitted in any undercut areas it will lock the impression on the tooth. This excess compound may be fractured from the impression, but this manipulation may cause distortion. The compound impression is taken in a manner similar to the wax impression technique illustrated in *Figs.* 5 and 6. This impression must be thoroughly chilled before removal is attempted. The impression may be removed by placing instruments at the bucco-gingival and linguo-gingival of the

band, exerting force in the line of withdrawal simultaneously. The impression is washed, dried, and inspected for accuracy. A wax bite is taken that will register the proximal and occlusal contact areas. A die may be made of either amalgam or artificial stone.

The wax bite is placed on the lubricated die and the carving of the restoration completed. Additional wax can easily be fused to the pattern on the die, and marginal corrections made to compensate for wax shrinkage. While the pattern could be invested and cast at this point, it is felt that the variables involved in the technique, the materials used, and the complexity of the restoration warrant further verification on the tooth. Consequently, all margins are checked with the wax pattern in position in the mouth. Axial contours, occlusal anatomy, and contact points are also corrected at this time. The pattern is removed with a gold staple, sprued, and washed in preparation for investing.

SUMMARY

Three wax pattern techniques for inlays are presented stressing the following points:—

1. Inlay waxes should be heated slowly and thoroughly.

2. The wax should be manipulated at the highest practicable temperature to minimize possible distortion from elasticity.

3. All margins of the pattern must be burnished to correct wax shrinkage and ensure marginal seal.

4. The force of removal of the wax pattern from the cavity must be in the direction of withdrawal only.

REFERENCES

GREEN, ROBERT O. (1948), *A Manual of Operative Dentistry*, 113–129, Wm. C. Brown Company, Dubuque, Iowa. (All illustrations were taken from this manual.)

SAUDER, WILMER, and PAFFENBARGER, GEORGE C. (1942), *Physical Properties of Dental Materials*, 149–153. Washington: U.S. Government Printing Office.

SKINNER, EUGENE W. (1940), *The Science of Dental Materials*, 248–259. Philadelphia and London: W. B. Saunders Co.

CONVERTING THE WAX PATTERN TO THE CAST GOLD INLAY

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THE problem of converting a wax pattern into a sound, properly fitting casting is one which has intrigued dental technicians and scientists for many years. Because each dental cavity preparation is different in some detail from all other preparations, the inlay which must fit it perfectly is unique and different from other types of castings. The steps in the conversion require a consideration of the following factors:—

1. The properties of wax from which the pattern is made.

2. The amount of alloy contraction on freezing and cooling.

3. An analysis of the type of preparation to determine the amount of contraction to be compensated.

4. A knowledge of the expansion characteristics of investing materials so that proper heating may be conducted and satisfactory compensation for metal contraction may be secured.

5. The proper selection and use of sprues so that shrinkage porosity may be avoided.

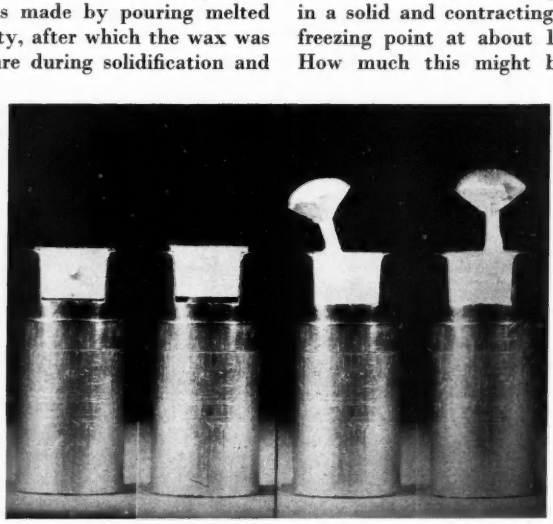
6. Proper use of the blowpipe to prevent metal oxidation and occlusion of gases.

Each will be discussed briefly.

Fig. 1 shows the effect of delay in investing the wax pattern after it has been properly sprued and removed from the cavity. C and D in this figure have been invested immediately after removal of the pattern from the cavity, and it can be seen that these castings fit the cavity very well. The only difference between the casting shown in C and D as compared with A and B is that there was some variation in the way the wax pattern was made in A and B, and in the length of time they were

permitted to remain at room temperature before they were invested.

The pattern from which the casting in A was produced was made by pouring melted wax into the cavity, after which the wax was held under pressure during solidification and cooling to room temperature. After removal of excess wax the pattern was sprued, removed from the preparation, and permitted to remain at room temperature for one hour before investing. The pattern in B was made by forcing semisolid wax into the cavity. After removal of wax this pattern was sprued and permitted to remain on the sprue base overnight before investing.



A B C D

Fig. 1.—Castings A and B show effect of delay in investing which has resulted in distortion of wax patterns. Castings C and D were invested immediately upon removal from cavity.

Investing procedures, burn-out, and castings in all four were identical. The reason A does not fit as well as C and D is because certain strains remained in the wax pattern after the wax had frozen and cooled. These strains are due to the natural contraction of wax on cooling.

Reference to *Fig.* 2 will show the thermal expansion of wax due to change in temperature. It will be noted that from a temperature of 110° F. down to 95° F., which is approximately the working temperature of wax in a cavity in the mouth, the wax has contracted about 0·7 per cent. If one were to invest a pattern at room temperature of 70° F. another 0·4 per cent contraction would be added.

Above the 110° F. temperature the wax is in a solid and contracting condition from its freezing point at about 140° down to 110°. How much this might be is not precisely known. But it would help to induce certain strains within the wax pattern which are quite impossible to relieve. If one were to pass a heated spatula through the wax pattern to attempt to relieve the strains, they would reoccur as the melted wax would again freeze and cool down to working temperatures.

It is not possible to relieve the strains in wax patterns induced by the natural contraction of the wax from the temperature at which it was forced into the cavity or flowed into the cavity down to working temperatures.

After the wax pattern is removed from the cavity, these strains begin to change the shape of the pattern. The warmer the room or place of storage of the pattern the faster changes will take place. Patterns may be stored in a refrigerator for long periods of time without warpage. The amount of change in the shape of the pattern will depend upon the amount of strain, which will be at a minimum depending upon the temperature and rigidity of the wax when it is flowed or forced into the cavity.

The reason the casting A shown in *Fig.* 1 does not fit as well as B and much worse than C and D is because this pattern had considerably more strain in it owing to the fact that this wax was forced into the cavity when it was in a semisolid condition, and therefore strains were induced owing to changing the shape of the wax as it was forced into the cavity. In this pattern strains due to changing the shape of the pattern and those due to the natural contraction of the wax were both present.

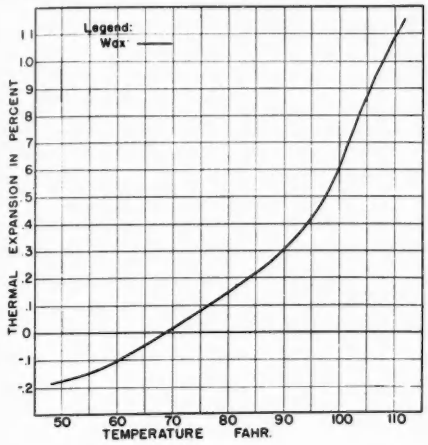


Fig. 2.—Curve showing wax expansion due to temperature changes.

The only purpose of introducing a discussion of the properties of wax into this paper is to emphasize the importance of investing the wax pattern immediately after its removal from the cavity. Regardless of how carefully the pattern is sprued, investment selected, pattern invested, and casting made, all of these steps carried out precisely and properly would not correct the change in the shape of the wax pattern which could occur by neglecting to invest it immediately.

The amount that gold contracts in the dental mould upon passing from the liquid to the solid state and then cooling down to room temperatures will vary somewhat, depending upon the precise composition of the alloy being used, the shape of the mould into which the alloy has been cast, the strength of the investment material, and the character of its surface. The most commonly used figure to represent this contraction was established by R. L. Coleman (1928) as approximately 1·25 per cent.

It would seem, therefore, that if an investment produced a thermal expansion of 1·25 per cent, in all cases the inlay would fit the cavity properly. This is not quite true because other factors enter the picture. Although there is no very good practical evidence to indicate the following to be true, it is possible that when a wax pattern is made in the mouth and removed to be invested at room temperature there may occur a contraction in the wax of approximately 0·4 per cent. This then would decrease the size of the wax pattern from that at which it was made when removed from the cavity in the tooth.

Theoretically at least, this 0·4 per cent should be added to the contraction of the gold, bringing the total amount of contraction to be compensated for close to 1·6 per cent. Also it is not necessarily true that the temperature of the room would be cool enough to produce a contraction of the wax of 0·4 per cent below its size at body temperature. It is argued, therefore, that the temperature of the room should be taken into consideration in selecting the amount of expansion in compensating for wax and gold contraction. Actually this is part of the basis of the investments offered by the Kerr Dental Manufacturing Co., using various proportions of Kerr cristobalite investment with Kerr control powder (Phillips, 1935).

In my judgement another and more important factor in determining the amount of contraction to be compensated for is the character of the preparation itself. Considering first the full crown, it is possible that the walls of this preparation would be long and almost parallel. I have seen many such types of preparations, especially on upper first and second molars where there was also a small amount of recession of the gingival tissues.

Conversely I have observed the opposite, particularly on many lower molar crowns which were short and somewhat converging toward the occlusal before any preparation

was even begun. It seems quite necessary that there would be a small amount of friction to hold the casting firmly in place when seated on the preparation or in the cavity. If the preparation is cone-shaped or tends to be in this direction, and the casting fits very accurately, the only time that the casting should touch the tooth is when it is completely seated. Conversely, if the walls are cylindrical in shape or parallel to each other, the preparation should develop a considerable amount of friction as it is being seated providing it fits the preparation accurately.

I have found that in the preparation where the walls are long and parallel, slightly more compensation for contraction is desirable, and where the walls are short and converging it is well to make the casting even just a little small in order that it may develop a little friction as it is finally seated.

In a study I conducted at Columbia University where I made the castings for a group of dentists who were employed in a teaching clinic conducted by Columbia University, I secured two or three wax patterns for each cavity and made castings using investments with different thermal expansion levels (Crawford, 1933). These castings were then returned to the dentists and they told me which ones seemed to fit more snugly than the others, and also the ones which seemed to fit the cavity the best. The dentists in this clinic did not know to what levels the investment had been expanded in making the different castings. They reported, however, with considerable unanimity, that the castings for full crowns, large M.O.D.s, backings for porcelain facings, and all rather large castings which also had long parallel walls seemed to fit the preparation best when they had been made with investments that expanded approximately 1·4 per cent thermal expansion.

When cavity walls were short and converging, as occasionally occurred on three-quarter crowns on anterior teeth and two-surface fillings in bicuspids, and even on full crowns which have short converging walls, the dentists preferred the castings which were made with investments that had expansion levels at approximately 1 to 1·1 per cent. This made the castings for preparations with short converging walls have a small amount of friction as they were seated, and held them in place during the finishing of margins and the taking of impressions for fixed bridge work in case they were bridge abutments.

Castings made with investments that expanded more than 1·4 per cent were usually reported as a little too large or loose. It is my feeling that the most consistent results in compensating satisfactorily for the contraction of gold and producing castings which fit properly are obtained by the use of the thermal expansion of the investments rather than by attempting to use wax expansion, setting expansion, or so-called hygroscopic expansion.

If it were not possible adequately to compensate for the contraction of gold by thermal expansion alone, then some other procedure as just mentioned might be a suitable alternative, although in my experience the use of these techniques such as wax expansion and hygroscopic expansion do not lead to consistent results. Wax when heated does expand, as we have already shown earlier in this paper, but owing to strains in the pattern it will also distort rapidly when heated. This, I feel, is the main flaw in our early attempts to compensate for the contraction of gold by the use of wax expansion in partially compensating for the contraction of gold.

By the use of wax expansion we frequently got a well-fitting casting, but we also frequently got castings which were badly distorted. I feel that dentistry's frantic efforts to compensate for the contraction of gold were never very satisfactorily accomplished until after investments were made which had a sufficient amount of thermal expansion to compensate for gold contraction. This was done when cristobalite silica was incorporated in dental investment materials. Previous to that time quartz silica had been used as the expanding agent in the investment, and it did not expand enough to produce investments which would ultimately expand over 1 to 1·1 per cent.

Quartz silica in the investment has a long gradual conversion accompanied by a rather rapid expansion ending at 1100° F., above which there is little change in the expansion reaction of quartz silica. Investments therefore which use quartz as the expanding agent should be heated at least to 1100° F. in order to arrive at a plateau or maximum expansion of the investment, and should be heated beyond that for several hundred degrees in order that the operator may have time to melt and cast his gold before the investment begins to cool below 1100° F. and show a considerable amount of contraction on cooling.

Cristobalite silica, however, converts at a much lower temperature, completing its conversion and expansion at about 500° to 600° F., above which it seems to be quite stable. However, it is necessary to heat such an investment to a temperature of at least 800° or 900° F. in order to drive off wax and combined moisture.

In mounting wax patterns on sprues preparatory to investing, it is my feeling that a large-diameter sprue should be used, and that the distance between the sprue former and the casting should be not over 4 to 5 mm. The large short sprue will provide a continuous flow of metal during freezing from the button to the casting providing there is ample metal in the button. Where air-pressure machines are employed, there is some danger that molten metal will run down the sprue hole if it has been formed with a sprue larger than a 14 gauge wire. However, if the centrifugal machine is being used, sprues up to 11 gauge are recommended, depending, of course, upon the size of the casting.

Dense castings are, of course, definitely desired; and where small sprues are used, there is danger of shrinkage porosity in the casting which will leave porous places which will later cause discoloration in the oral cavity. Care should also be exercised in melting the alloy so that oxidation of the copper in the alloy is prevented and that the silver is not contaminated by the presence of oxygen. Silver when molten will absorb oxygen quite freely, and upon freezing will cast it off and produce porous places in the casting. Palladium is also quite apt to occlude or dissolve hydrogen, and it too is insoluble after freezing.

Alloys which are high in palladium and silver should be used with particular caution in melting. The reducing part of the flame should be employed and the metal should at all times after melting has begun be covered with a flux to prevent the gases from the blowpipe or oxygen from the air coming in contact with the metal.

It is quite easy to observe when a metal has been properly melted and protected with flux. In the case of an air-pressure casting machine, the surface of the button will be rounded and smooth (*see* buttons in *Fig.* 1); in the case of a centrifugal casting, the button will be flat but smooth; and in all cases it should be the colour of the gold, having been protected by a covering coat of flux. The metal in buttons which appear to be flat, wrinkled, and black has been abused in melting.

Overheating of the investment may cause breakdown of the plaster portion of the investment, resulting in a sulphur coat on the casting. This is extremely difficult to remove, and is, I think, most easily removed by the use of hydrofluoric acid. This acid also will dissolve the silica adhering to the casting and simplifies the cleaning of the casting. It is dangerous, however, to handle and must be kept in a wax container of some kind. The sulphur coat on a casting may also be removed by heating the casting in the oxidizing portion of a bunsen burner and then pickling in dilute sulphuric acid. It may require several heatings to remove this coat in case it is persistent.

REFERENCES

COLEMAN, RICHARD L. (1928), "Physical Properties of Dental Materials", *Bur. Stand. J. Res.*, Wash. Res. Paper, No. 32, 910.

PHILLIPS, D. W. (1935), *J. Amer. Dent. Ass.*, **22**, 439.

CRAWFORD, W. H. (1933), *J. dent. Res.*, **13**, 229.

A Remedy for Phenol Burns.—Phenol burns either on the hands or in the mouth can be neutralized by putting glycerin on them immediately.

REVIEW OF GENERAL DENTAL SERVICES IN 1952

Tables published in the report of the Ministry of Health show that between 1950 and 1952 there has been a marked shift towards giving dental treatment to more children and fewer adults and elderly people. Courses provided for children have nearly doubled in number while those for people of forty-five and over have fallen by over a half in two years. The total number of courses for treatment for which payment was claimed in the year was 6,803,443, of which 1,646,843 mostly related to the provision of dentures; the remaining 5,156,600 courses related mainly to conservative treatment. The corresponding figures for the previous year were 7,232,339, of which 2,565,644 related mainly to dentures and 4,666,695 related mainly to conservative treatment. In addition there were 2,196,637 emergency treatments against 2,731,775 in the previous year. The amount of fees authorized by the Dental Estimates Board and notified to Executive Councils during the year was £27,004,068, of which £5,010,657 was payable by patients. A diagram shows that in the first half of 1952 conservative treatment was at a higher level than at any time since the service started. In part, this was due to some anticipation of charges for dental treatment which were introduced on June 1, 1952. There was a fall in the second half of the year in conservative treatment but comparison with the corresponding period of the previous year shows little change (pp. 56–8).

As would be expected, the reduction in the numbers of older patients and the increase in the numbers of younger patients requiring treatment under the National Health Service reflects a transfer from the provision of dentures to an increase in the provision of conservative treatment. An interesting feature is that the fall in the demand for dentures has been more pronounced in the case of full upper and lower dentures than in the case of partial dentures. In 1950, 61 per cent of courses for dentures related to sets of full upper and lower dentures, and this ratio had, by the latter part of 1952, fallen to 46 per cent. Following the introduction of charges for dentures in May, 1951, more old dentures have been repaired or have had teeth added to them or have been relined. In 1950–1 some 860,000 patients had work done on dentures already in their possession, while in the two halves of 1952 the corresponding annual rates were 1,100,000 and 1,060,000 respectively (pp. 60–1).

The fall in the number of emergency treatments since the introduction of the dental treatment charge last summer causes the Ministry to observe: "A patient not entitled to exemption from charges would have to pay the full cost of extractions and dressings whether or not the treatment was provided under the service, and it is probable that in many instances, in the fourth quarter, such treatment was carried out privately" (p. 62).

If some rough allowance were to be made for this diversion to private treatment, it may be concluded that the real fall in the volume of conservative treatment of adults between 1951 and 1952 is in the region of 5 per cent (p. 66).

MEDICAL AND DENTAL SERVICES IN THE ARMED FORCES

The institution of the National Health Service in the United Kingdom has led to appreciable changes in the structure of professional practice in the medical profession in this country. At the same time, the medical services of the Armed Forces are faced with considerable problems. The current trend of recruiting for permanent regular commissions is disappointing, and applications for these commissions in the medical branches have steadily declined over recent years.

The Government believe that the problem of providing medical and dental services for the Armed Forces now requires thorough examination in all its aspects. They have therefore decided to set up a small independent

committee of not more than five members to advise them on this matter. Its terms of reference will be:—

"To review the arrangements for providing medical and dental services for the Armed Forces at home and abroad in peace and war; and to make recommendations."

Lord Waverley has agreed to act as Chairman, and the names of the other members will be announced later.

The examination of the problem by Lord Waverley's Committee will, however, take some time, and the Government have therefore decided to give effect to certain immediate steps which it is hoped will result in increased numbers of medical men being attracted to make a career in the Service. These steps fall into two main categories—increases in emoluments, and other administrative measures affecting conditions in the medical branches of the Services and designed to widen their appeal to potential recruits.

In the dental branches, increases in pay are to be granted which will range from about £80 per annum for a Major on promotion to about £230 for a Brigadier. In addition, it has been decided, as a temporary measure, to introduce a Permanent Commission Grant of £1,250 (taxable); this will be paid in future to officers granted permanent commissions, payment being subject to the completion of one year's satisfactory service as a dental officer on any type of commission.

New provisions in the second category include the following:—

a. There will be a considerable number of posts for retired officers of the medical branches whose services can be effectively used in less active jobs, so as to release younger men for the more active ones.

b. All doctors seeking a permanent career in the Royal Army Medical Corps will be given the opportunity of taking a regular commission on entry, instead of, as hitherto, being required first to take a short-service commission.

c. Late entrants to the medical branches of all three Services, whether on permanent or short-service commissions, will have their seniority as officers antedated, according to their civil experience, up to a maximum of 7 years.

d. The scheme already in operation in the Royal Air Force, for the grant of three-year short-service commissions to doctors with a national service liability, will be extended to the Army.

The interim measures set out above will be brought into force from October 1, 1953.

Multiple Fræna

Routine examination of a female patient, aged 16 years, with a badly neglected mouth, revealed the presence of multiple fræna in both jaws. A history was forthcoming to the effect that two close antecedents had had cleft-palates, one with a hare-lip, and when the patient was 5 years old, adherence of the lower lip to the gum was commented upon by the family doctor.

In the upper jaw, as well as there being an abnormally broad labial frænum, there were two smaller bands opposite the lateral teeth. In the lower jaw four such bands existed in the incisor region in addition to one between the second premolar and first molar. This latter band gave rise to a diastema between the teeth. All the bands had full attachment to the alveoli and lips and were apparently of normal mucosa. The Wassermann test was negative and there were no syphilitic stigmata apparent. The bands were removed and histologically

ABSTRACTS
from Other Journals

were seen to consist mainly in myxomatous tissue with a considerable amount of elastic tissue and well-established vascular channels and lymph-vessels together with small nerve fasciculi and one bundle of striated muscle.

In commenting upon this case Professor Radden points out that perusal of the literature has failed to reveal a similar one and that

it must be a very rare condition. He considers the multiple fræna to be due to the failure of the epithelial mass known as the lip furrow or the labiodental lamina to atrophy completely, such atrophy normally taking place at the tenth week of intra-uterine life. He says there are two possible causes for this anomaly: The first is congenital syphilis. This is ruled out, however, because although a negative Wassermann is possible in this disease at 16 years one would expect to find other signs of congenital syphilis, e.g., endarteritis, which was not in evidence in the sections. The other possible cause is linked up with the hereditary factor. It has been stated that the history revealed two instances of cleft-palate on the maternal side of the family. A normal frænum is composed almost entirely of white fibrous connective-tissue with no muscle-fibres, and the presence of a striated muscle band through the abnormal ligaments may explain why the epithelial structures failed to atrophy and form a normal sulcus. Migration of muscle elements from facial musculature to establish relationship with the forming maxillæ could then be an acceptable explanation.—RADDEN, H. G. (1952), *Aust. J. Dent.*, **56**, 329.

Roentgen-ray Cancer of Hands of Dentists

The small, but persistent, incidence of damage from radiation to the hands of dentists indicates that there must arise occasional circumstances in which some practitioners relax their usual caution, and hold dental films in the mouths of their patients. Repeated exposures for periods of from 4 to 30 years produce cumulative effects, with pathologic changes which include endarteritis, scarring, atrophy, and cancer.

The clinical manifestations of damage from radiation may be: dryness, scaliness, fissuring, ulceration, telangiectasis, atrophy, keratoses, and squamous-cell carcinoma. These changes are usually limited to the thumbs and the first two fingers. The tips of the index fingers are spared because of the protection provided by the teeth, the alveolar bone, and the metal foil on the back of the dental film.

Prevention is effected by scrupulous avoidance of exposure. Treatment of the dryness and scaliness is by the sparing use of oily lotions or creams. Fissures, abrasion, and ulcerations are treated by producing a crust with mercurochrome, by dry protective dressings, or by scarlet-red ointment-impregnated gauze dressings. Keratoses may be treated by electrodesiccation or by chemical cauterization, preferably with microscopic examination if there is any suspicion of malignancy. Cancer may be treated with surgical, electrosurgical, or chemosurgical intervention. The last method, with its complete microscopical control of excision, has the advantages of unprecedented reliability and maximal conservation. Treatment with radium or roentgen rays is contra-indicated.—MOHS, FREDERIC E. (1952), *J. Amer. dent. Ass.*, **45**, 60.

Nomenclature of Diseases of the Supporting Tissues of the Mouth

The origin of nomenclature is here described. The necessity for a terminology based on an understanding of pathology is stressed and the anatomical limits of the periodontium are defined. Reasons for using the prefix peri are given. A basic classification of gingivitis, periodontitis, gingivosis, and periodontosis with the use of marginal gingivitis to signify early stages of a periodontitis is proposed. Atrophic and resorptive changes are discussed, and it is emphasized that epulis is a word which should be confined strictly to the initial clinical diagnosis.—WADE, A. B. (1952) *Paradentologie*, **6**, 156.

Reattachment in Periodontal Therapy

The clinical and histological aspects of periodontal reattachment following subgingival curettage are discussed in their relationship to present knowledge, and especially in their relationship to experimental investigations on rhesus monkeys. Connective-tissue reattachment of the soft-tissue wall of a periodontal pocket to the root surface can be obtained if the following requirements can be met:—

1. The local irritants which are responsible for the formation of pockets must be eliminated, clinical signs of gingival inflammation being thereby reduced to a minimum.

2. The pocket must be accessible for an efficient epithelial and cemental curettage.

3. The post-operative blood-clot in the pocket must be narrow and well protected, and must receive optimal nutritional supply.

Narrow, deep periodontal pockets, especially of the intra-alveolar type, and pockets with a firm, rather thick, free gingival wall which is closely adapted to the surface of the tooth, respond favourably to subgingival curettage. This procedure does not give good results in the presence of marked inflammation, in wide open pockets, and in pockets in which the gingival wall is thin and made up mainly of epithelium.

Epithelial reattachment can be obtained even in the presence of rather severe inflammation; but the closure of a pocket by epithelial reattachment is usually temporary and functionally unsatisfactory. — RAMFJORD, SIGURD, (1952), *J. Amer. dent. Ass.*, **45**, 513.

Management of a True Hæmophiliac requiring Extraction of a Primary Tooth

A case is presented of an 11-year-old child who follows the typical pattern of a classical hæmophiliac, requiring an extraction of a deciduous tooth. There is no history of the blood dyscrasia in previous generations.

Before the operation it was thought advisable to reduce the coagulation time to within normal limits by transfusions of whole blood, and to control infection oral administrations of an antibiotic were prescribed. To avoid creating another source of hæmorrhage, the puncture point of the needle was made at the gingival crevice.

Because of the shallowness of the depression left after the extraction of the tooth, and the difficulty of anchorage and the presence of relatively high interdental papillæ, the socket could not be protected by a dressing in a splint. Owing to the flow of saliva and the movement of the tongue and cheeks the clot was repeatedly dislodged, resulting in recurrent bleeding, although fibrin and thrombin dressings were used to assist clot formation. To replenish the coagulant factors of the blood, two additional transfusions of whole blood were given.

The child had an uneventful recovery in spite of the unfavourable factors, such as muscular activity, the patient's lack of co-operation, and the inability to protect the wound.—LINDSAY, W. R., SUHER, T., and CHATTERJEA, S. P. (1953), *Oral Surg.*, **6**, 274.

The Attachment of Calculus to Root Surfaces

An investigation into the attachment of calculus to root surfaces was made on fifty teeth. A transverse section of the portion of root bearing calculus was made by cutting with a double-sided diamond disk. Some specimens were fixed in Zenker-Formol solution and decalcified in 10 per cent formic acid over a small amount of an ion-exchange resin and the remainder by combined fixation and decalcification using formalin and trichloro-acetic acid. After embedding in celloidin and cutting, the sections were stained with hæmatoxylin and eosin and a bacterial tissue stain. Four methods of attachment were observed:—

1. By means of the secondary cuticle (dental cuticle).

2. To the microscopic irregularities of the cementum surfaces, i.e., spaces formerly occupied by Sharpey's fibres.

3. By penetration of micro-organisms into the cementum.

4. By the deposition into areas of resorption of the cementum.

It was noted that the type of attachment was seldom singular and the strength of the different types was sufficient to account for the varying degrees of difficulty encountered in the removal of calculus and held to be support for the belief that careful curettage is necessary.—ZANDER, H. A. (1953), *J. Periodont.*, **24**, 16.

Hæmorrhage in Relation to Dentistry

Factors in coagulation of Human Blood.— Howell's theory—Prothrombin + thromboplastin + calcium ions leads to formation of thrombine. Thrombin + fibrogen gives fibrine. When these factors are deficient in any way clotting is delayed. Prothrombin production is dependent on vitamin K. Prothrombin and

fibrogen are formed in the liver. The absorption of vitamin K depends upon adequate amounts of bile salts. Thromboplastin is liberated when tissue cells are injured or ruptured and is found in blood-platelets and certain tissues of the body, for example, the brain, lungs, thymus, and testes. Therefore, if the production of prothrombin or thromboplastin is interfered with, the production of thrombin will be altered and hæmorrhage will result. The most important systemic factors influencing the coagulation of blood are: (1) Hæmophilia; (2) purpura hæmorrhagica; (3) agranulocytic angina; (4) chlorosis, (5) Hodgkin's disease; (6) polycythemia vera; (7) hypertension; (8) jaundice; (9) septicæmia; (10) vitamin C and K deficiency; (11) arteriosclerosis; (12) diabetes mellitus; (13) metal poisoning; (14) endocrine disturbances.

Transfusions of either whole blood or normal plasma are given to reduce coagulation time of hæmophilic blood. If extractions are indicated in a hæmophiliac it is advisable to construct beforehand an immobile splint which does not apply pressure on the socket but only holds the hæmostatic agents in the socket. The teeth and their gingival attachments are loosened with small orthodontic type rubber bands placed around the neck of the teeth. Whole blood transfusion (200 c.c.) is given pre- and post-operatively. Multiple extractions under general anæsthetic should not be a routine procedure, and the use of elevators and surgical interference should be avoided. The wounds are dressed with thrombin powder in conjunction with gelfoam or oxycel, which is inserted loosely into the socket. Antibiotic treatment can be given if necessary.

The hæmostatic agents used are: tannic acid, alum, ferric subsulphate, adrenaline, thromboplastin, fibrin foam, etc. Agents such as fibrin foam, oxycel, and gelfoam can be left in the sockets as they will either dissolve or be absorbed without interfering with healing.

The most important method of stopping hæmorrhage, namely by direct pressure, should be tried in each case first before any medical or surgical intervention is thought of. For severe bleeding involving surgery, the external carotid artery may have to be tied which will arrest bleeding from the lingual, facial, occipital, internal maxillary, and temporal arteries.—SAMAHA, FRANCIS J. (1953), *Dent. Digest*, April, 152.

Allergy to Local Anæsthetic Agents

The literature contains many references to reactions following local anæsthetics, but few instances due to allergy. Untoward reactions may be due to idiosyncrasy to a drug, to the use of excessive quantities of a drug which is ordinarily safe within a certain dosage range, to vaso constrictions, or to allergy.

A case is recorded of a female, aged 32, who presented with a large facial swelling following the use of a local anæsthetic in the mouth. The swelling appeared 6–8 hours after procaine infiltration, was maximal after 24 hours and subsided in 2–3 days. These events took place on two or three occasions. The development of the manifestation was recent, there being no such occurrences during adolescence. Trauma and infection as possible causes were rejected in favour of drug sensitivity. Impetus was given to this theory when it was recalled that two hours following intraspinal anæsthesia (pantocaine) for labour, the patient had lost consciousness for about an hour for no apparent reason. On regaining consciousness there had been headache for a day or two and a dermatitis had developed at the lumbar puncture site. Incidentally, the patient had suffered from seasonal hay fever, as had her son.

One minim of procaine solution from four different manufacturers' sources (0·5 per cent) was injected intradermally in each of four sites on the forearm. There was no immediate reaction but in about six hours each site began to swell and redden, and at the end of 24 hours each site was 2–3 cm. in area and was tense, red, and painful. These signs disappeared in 2–3 days. A month later an intramuscular procaine penicillin injection was given in the gluteal region, for a chest infection, and in about six hours each of the sites on the forearm became swollen, red, and slightly itchy and painful. There was no headache and it was by now about a year since she had any anæsthesia for dental work. At the time intradermal tests to pantocaine were negative.

The commentary on the case says that it seems to have been generally recognized that immediate allergic reactions may follow the use of local anæsthetic agents, but it may not have been sufficiently realized that delayed reactions of allergic nature may occur. Reactions in a superficial area are uncomfortable but seldom grave. The case reported did not have a positive skin test, immediate or delayed, to the spinal anæsthetic agent used, but the possibility that the post-partum collapse may have been an allergic reaction due to spinal anæsthetic, with œdema of the meninges, must not be overlooked.

When sensitivity to local anæsthetic agents is suspected, skin tests should be carried out before use.—MITCHELL, H. S. (1953), *J. Canad. dent. Ass.*, **19**, 127.

Practical Management of Occlusal Dysfunctions in Periodontal Therapy

In order to be of universal practical importance, dental procedures must be: (1) of demonstrated value; (2) capable of execution by the majority of dentists; (3) expeditious enough for utilization whenever such use is indicated; (4) within the financial reach of the majority of dental patients. The clinical study and treatment of occlusal dysfunctions have, in many cases, become associated with procedures which fail to meet these criteria.

The problems which are associated with the use of mounted study casts on an adjustable articulator are described. The limitations of accomplishment by selective grinding are emphasized, and several questions relative to this procedure are discussed.

The classifications of occlusal dysfunctions which form the basis of treatment are: (1) condyle displaced from normal position (centric) because of prematurity contacts or abnormal positioning of the teeth; (2) premature contact of posterior teeth in centric relation; (3) premature contact of anterior teeth in centric relation; (4) cuspal interferences during mandibular excursions on the non-functioning side, or on the functioning side; (5) protrusive interferences in anterior teeth, posterior teeth, or overclosure, with deep anterior overbite.

Six case studies, selected from a larger group, are presented. The occlusal dysfunction is analysed after direct examination of the patient and also from study casts mounted on an adjustable articulator. In the other part of the study, the dysfunction is analysed after direct examination and observation of the patient through the utilization of waxes and articulating papers. The direct study of the patient required only one-third as much time as the indirect method. A comparison of study records revealed that in very few instances was significantly more information gained by use of mounted study casts than by direct observation.

Not all instances of occlusal dysfunction require the use of articulated study casts; but when direct observation does not lead to an understanding of the interferences, accurately articulated models should be studied before any grinding is done.—THOMAS, B. O. A., and GALLAGHER, J. W. (1953), *J. Amer. dent. Ass.*, **46**, 18.

Role of the Pulpless Tooth in Systemic Disease: A Summary

The concept that the pulpless tooth is a source of focal infection developed in the early 1900's. In 1947 the Council on Dental Health of the American Dental Association took steps to re-evaluate the scientific validity of this concept. A three-year search of the literature was made, and conclusions were published in the June, 1950, issue of the *Journal of the American Dental Association* which were based on current roentgenographic, anatomic, bacteriologic, and endodontic information. Recent studies concerning the effect of the "biologic-alarm" reaction on collagen tissue were reviewed, as well as the scientific evidence which is available on the aetiology of joint, cardiac, renal, ocular, and skin diseases.

During this re-evaluation, the following facts were determined:—

1. A focus of infection often does not develop into focal infection.

2. Anhæmolytic and viridans types of streptococci are frequently isolated from the root canals of pulpless teeth, but hæmolytic strains are rarely found.

3. Approximately 40 per cent of pulpless teeth which show roentgenographic evidence of periapical pathology, are negative for bacteria.

4. Root-end infection can be determined only by bacteriologic examination or histologic evidence of change.

5. Roentgenographic evidence of the restoration of normal root-end "architecture" can be accepted as evidence of the eradication of bacteria.

6. All studies which are based on the presence of bacteria in the pulps of extracted teeth must be discarded as evidence of the presence of an oral focus of infection.

7. The validity of the theory of elective localization of streptococci has not been established.

8. Even as late as the 1930's, poor laboratory techniques frequently contaminated the cultures which were being studied, and the dental roentgenogram was just beginning to be used widely.

9. Investigators must be cautious in assigning cause-and-effect relationships to co-incidental findings.

10. The nature of at least eleven types of rheumatic conditions must be kept in mind when the aetiology of joint disease is being studied.

11. Research workers have not yet completely isolated all the "biologic-alarm triggers" which are responsible for the bizarre changes in the collagen of connective tissue that result in such conditions as rheumatic fever, rheumatoid arthritis, periarteritis nodosa, disseminated lupus erythematosus, scleroderma, and dermatomyositis.

Such a background of concepts assists in the critical appraisal of available information.

This re-evaluation of the earlier theory of focal infection made it evident that sequential research was required in order that a final appraisal of the theory of focal infection might be achieved. It appears necessary to establish an accurate diagnosis of the patient's condition; to determine the strain of bacteria which has invaded the patient's tissue; to isolate this specific organism from the patient's pulpless tooth; and to establish the fact that there is a mechanism for the invasion of the patient's blood-stream by this organism, by recovering the organism from the blood-stream. Further research also is required in order to ascertain the precise role of sensitization of tissue in human disease. Then the final answer can be obtained.

As the result of a critical appraisal of information, the following conclusions may be drawn:—

1. Dentists should always be concerned with properly diagnosed oral infection, because of the possibility of an extension of this infection.

2. Dentists should be particularly concerned about transient bacteræmia from an oral source in patients who have valvular heart disease.

3. The evidence is poor for the support of an aetiologic relationship between oral foci and joint disease, heart disease (other than in patients with valvular damage), renal disease, ocular disease, and skin diseases. Dentists, therefore, should continue the eradication of oral foci as a therapeutic measure—not as a curative measure.—EASLICK, KENNETH A., (1953), *J. Amer. dent. Ass.*, **46**, 179.

The Physiology of the Stomognathic System

This is the cinefluorographic investigation in which the cycles of mastication were photographed by a motion-picture camera focused on a high intensity fluorescent screen. It was found that incision is not a simple act of the teeth cutting through food until it is severed but is a co-ordinated effort, of hand, arm, tooth, head, neck, and shoulders. Contact of the tooth seldom occurs. In no case was there any evidence of tooth balance during incision, and tooth balance played no part in the stabilization of maxillary dentures. The dentures were stabilized by the tongue. The evidence strongly suggested that centric occlusion is the only position of tooth contact of any significance that occurs during function. —JANKELSON, B., et al. (1953), *J. Amer. dent. Ass.*, **46**, 375.

THE DENTIST LOOKS AT HIMSELF

The Carnegie Institute conducted a survey into the requirements for personal success in various professional fields. They came to a conclusion that only 15 per cent of a man's success is due to technical ability alone, and the remaining 85 per cent of his success is due to his personal relationship with others.

People are attracted to the dentists by their personalities. The best we can hope to do is to hold them by our good dentistry. Success is built of many factors, some large, some small.

Your attention is directed to ten ways in which you may attract desirable people to your practice and help to assure your success:—

1. *Be a Good Dentist.*—Plan and execute each operation to the very best of your ability. Use, and improve upon, the basic fundamentals you learned in College and Hospital. Take post-graduate courses in the subject of your choice. Read and then re-read your dental journals; discuss and compare techniques. Complete every case in such a manner that you would be proud to have your best dentist friend step into your surgery and examine your handiwork.

2. *Cultivate an Attractive Personality.*—The most pleasing personalities go hand in hand with good health, so achieve and maintain healthy bodies. Do you see your dentist twice a year for your own oral hygiene? Do you take enough exercise? Don't be discouraged. Don't lose your initiative. Have the ability and willingness to smile. Of all the things you wear, your expression is the most important. Take time to be friendly; only your friends come to your surgery, your enemies go to some other dentist.

3. *Maintain an Attractive Surgery.*—How does your reception room look and smell? Is the lighting bright and cheery? Are the chairs clean and comfortable? Are your curtains attractive? Is there plenty of fresh air circulating? Are the ash-trays freshly cleaned? Are the pictures on the wall tasty and well hung? Illustrations should bring peace and tranquillity and happiness and good taste. What about the magazines? Are they new? Are they well selected? Your surgery—is it immaculate? Is the floor clean and polished? Are the walls clean and freshly painted? Is the overall lighting bright? Is the ventilation good? Are the instruments all put away? Are the windows clean, and the curtains? The over-all impression should be that of refinement and good taste.

4. *Present an Attractive Working Team.*—Just as you look at your patients and make up a mental estimate of them, so the patients are doing the same all the time. The first impression they have is of your office staff and your environment. They are looking you over from head to foot, so look, and act, and think, and dress, and smile your very best. The very first time you are seen you make an impression, by your appearance, your posture, your expression, your smile, and your attitude. Make it a good one.

5. *Obtain Efficient Working Conditions.*—Operate from a stool whenever possible. Check the fit of your shoes and stand on a rubber mat. Check the height of the chair several times during each operation, and adjust it when necessary. Don't hesitate to ask your patient to turn the head and raise or lower the chin for your convenience.

6. *Maintain the Patient's Comfort.*—When a patient walks in your door he becomes your guest—paying guest, if you please—so don't fail to do everything you can think of for his comfort. Take his or her wraps and hang them up carefully. Use warm water on every revolving instrument and rinse the mouth frequently with warm water containing a good mouthwash. Don't ask them to "Spit it out", tell them "empty your mouth, please". Use warm local anæsthetic solution, a fine, sharp needle, a topical anæsthetic and inject very slowly. It's wonderful to be known as the dentist who doesn't hurt. Take care of patient's clothes by protecting them with an apron. Let people know by your action that you have done your utmost for their comfort while in your care. This is ethical publicity of the highest order.

7. *Keep Accurate Personal Records.*—Be sure to enter on every patient's card a record of the

things he does and says that are of interest in the future, so that the next time the patient sits in your chair you can talk about these and keep him interested, and make him feel that you yourself are interested in them.

8. *Read, Study, and Utilize Psychological Aids in Practice Building.*—Poor dentistry cannot be condoned by useful psychological applications, but what a wonderful combination it can be when you are a good dentist and a good psychologist. Suggestion is a most effective means of controlling human behaviour. You will do much better to talk about beauty and pleasure, and satisfaction and happiness than to try to sell an ounce of gold or a piece of plastic. When you offer them a method of preserving their youth and charm, the price tag loses its importance. Nearly everybody has money for the things they want, so build your word picture carefully and skilfully in your case presentation. People should be reminded that they don't spend money for dentistry, they invest in happiness and beauty, and social acceptance, and youthful appearance. You don't repair a tooth, you rebuild it. You don't pull a tooth, you remove it. You don't fix up a mouth, you rebuild or recondition it. You don't grind a cavity, you prepare it. In other words, be careful of the words you say, and keep them soft and sweet. You never know from day to day which ones you will have to eat yourself. Compliment your patients for something while they are in your office. When they have had a long session, compliment them for being such fine patients. Compliment them for the progress they are making with the new dentures. Compliment them for taking such good care of themselves after that difficult extraction. Your assistant can compliment your women patients on their hair-do or their good choice of clothing, you can both compliment boys on their broad shoulders, or little girls on their long eyelashes. In fact, every person can be complimented in many ways—and how we all love it.

9. *Select a Good Listening Chair.*—A patient often wants to tell us his story, especially on the first visit. Why not let him unload his mind? Sooner or later we will have to listen to his recital, why not now. This is where your listening chair comes in. Provide yourself with a comfortable chair with arms, and place it in front of the window facing the patient, with the dental chair lowered so that you and the patient are at eye level and both are seated and comfortable. Then listen. Write down and make a few notes. Then ask the patient what he has in his mind. Having heard his story, you examine the patient's mouth and then the patient will ask again: "Well, what do you think you can do for me?"—and now is the time to tell him what is necessary to render his whole mouth healthy. This may be the time to discuss fees, pointing out again that the money that you earn is not for gold, silver, or expensive plastic or porcelain, but for your skill and ability that would help him to keep his teeth longer and enjoy the best of health.

Sitting down and listening, people accept you as a consultant delivering the knowledge and judgement that is in your head. When you stand you become an artisan or a craftsman delivering the skill that is in your hands.

10. *What are You going to do about it?*—

"You are the fellow who has to decide,
whether to do it—or cast it aside;
Whether to strive for the goal that's afar,
or be contented to stay where you are.
Take it or leave it—here is something to do;
you are the fellow—it's all up to you."

—ASKEY, H. A. (1952), *North-West Dentistry*, **3**, No. 4, Oct.

BIRMINGHAM COLLEGE OF TECHNOLOGY

THE distribution of prizes to successful students taking the course for Dental Technicians, will be held at the College of Technology, Suffolk Street, Birmingham, 1, on Wednesday, Nov. 4, 1953, at 7.0 p.m. The ceremony will be followed by a lecture. The meeting will be open to all members of the dental profession and their friends.

Professor J. Osborne, Head of the Department of Dental Prosthetics at the University of Birmingham, has kindly consented to distribute the prizes, and afterwards to deliver a lecture entitled "Recent Advances in Dental Technology". The chair will be taken by the Principal of the College, Mr. J. Wilson.

BOOK REVIEWS

DENTISTRY IN ANCIENT INDIA. By K. M. Choksey, Zeug.D.S. (Vienna). With a Foreword by Dr. N. N. Bery. $4\frac{3}{4} \times 7\frac{1}{8}$ in. Pp. 87 + viii. Illustrated. 1953. Bombay: The Popular Book Depot. 10s. 6d.

This small book will be of interest to those who like delving into the past, and after reading it one is inspired to know more. The history of medicine and dentistry in ancient India is complicated by legend superimposed on true facts, and it is difficult to separate them. A greater difficulty is to realize that what to our Western minds may be fiction, may to the Oriental be fact. The basic principles are far removed from present-day Western thought, but there is no doubt that long ago a high standard of medicine existed. The exacting requirements of student admittance ensured that only the very best entered the profession. While obviously accepting the history as it is written by the author, his conclusions cannot be accepted. It is difficult to believe that its decline was even partly helped by the British occupation over a period of 170 years, when it was already on the decline a thousand years before. This is history of dentistry in ancient India, not of the Eighteenth Century. It is impossible to assess what would have happened if India had kept to the principles of Sushruta and Charaka, for they are not the only principles that have disappeared in the dust of time. This book is a contribution to the history of dentistry and as such is worthy of a better production than this.

N. L. W.

TEXTBOOK OF EXODONTIA. By Leo Winter, D.D.S., M.D., F.A.C.D., F.A.C.S. Revised by William F. Harrigan, A.B., D.D.S., M.D., Professor of Oral Surgery, New York University, etc., and Leo Winter, jun., D.D.S., Visiting Oral Surgeon, Bellevue Hospital, Columbus Hospital. Sixth revised edition. $6\frac{3}{4} \times 9\frac{3}{4}$ in. Pp. 350, with 385 text illustrations and 1 coloured plate. 1953. London: Henry Kimpton. 60s.

The sixth edition of a "Textbook of Exodontia" as revised by Drs. William F. Harrigan and Leo Winter, jun., is a compact and well-balanced volume. Not too long, some 320 pages of text matter including 385 illustrations, it shows that a really efficient way of dealing with a practical subject in a textbook is by short explanatory passages interspersed or followed by many illustrations in good sequence.

Certain chapters from previous editions have been omitted, and as these had only a remote connexion with Exodontia, the new chapters on Diagnosis and History Taking, Chemotherapy and Antibiotics, Hæmorrhage, and Alveoloplasty, should assist any operator in making a comprehensive survey of a case from beginning to end.

In the foreword the revisers state the book is intended primarily as a text for students and general practitioners, but there are also parts which the exodontia specialist will find of considerable interest. The first three chapters are short, and deal with diagnosis, the approach to the patient, and the principles and manifestations of local anæsthesia. Here it must be said that the wide range of examinations, laboratory tests, and the details of case history and family history suggested to complete the diagnosis are such that a student ought to know in order to place exodontia in its true perspective against the functions and health of the rest of the human body; but the general practitioner would have difficulty in getting all this information, which comes more within the scope of a specialist attached to an institution or hospital.

The treatment of the practical subject starts with a few words about syringes, and from then on the illustrations tell the story. They include photographs, drawings, diagrams, and X-rays which are extremely informative and beautifully reproduced. It is perhaps unfortunate that the American technique of extraction, particularly with regard to mandibular teeth, is so different from that generally practised in Great Britain, as this chapter may not appeal to our students except toward the end where the removal of broken teeth and roots by means of gouges and elevators is shown. On

the other hand, it should be of great interest to general practitioners who do not know the American instruments and techniques.

The section dealing with the Principles and Procedures in Removal of Impacted Teeth, on which previous editions built a big reputation for the book, still comprises almost one half of the contents. The classifications are simple but truly comprehensive for every type of impaction one is likely to meet. X-rays of impacted teeth in situ in actual cases and in anatomical specimens are shown followed by drawings which outline the progressive steps in the cases and the manner in which the various instruments are used.

Hæmorrhage is dealt with briefly, but adequately, and the final chapter is on the antibiotics. Seven are listed with notes on the types of bacteria against which they are most effective. Methods of administration and dosages, their application singly or in combination, and their use pre-operatively as well as post-operatively, complete a very thorough study of the field of exodontia.

One fault in the book is that too little attention is paid to local post-operative treatment. For instance, excessive hæmorrhage is considered under three headings—primary, intermediary, and secondary—but insufficient hæmorrhage, or almost complete absence of hæmorrhage, or the breaking down of blood-clot by mechanical or bacteriological interference, which may necessitate treatment varying from simple socket syringing to a prolonged course of socket packing, are not mentioned. None the less "Textbook of Exodontia" is a very valuable contribution to modern dental literature. R. V. P. C.

ORAL HISTOLOGY AND EMBRYOLOGY. Edited by BALINT ORBAN, Loyola University School of Dentistry, Chicago. Third Edition. $6\frac{7}{8} \times 10$ in. Pp. 364, with 263 illustrations, including 4 colour plates. 1953. London: Henry Kimpton. 63s.

THIS book, first published in 1944, has now become so well established, and has received so many favourable reviews, that in welcoming this new edition there is little the reviewer can do other than to note the ways in which changes have been made since the second edition.

The principal change is in the composition of the editorial panel, and the absence of the names of Gottlieb, Diamond, and Nuckolls, all of whom have left this world, is observed with regret. Others have retired or ceased to perform research and teach the subjects to which this work is devoted, so new names have been added.

Among the new members are Frisbie and Sognnaes, and for this reason, as might be expected, the chapter on "Enamel" has received greatest attention in the process of revision. The other chapter which shows certain changes is that on the "Glands of the Oral Cavity". This has been reduced by three pages in an attempt to simplify it, whilst throughout the book small alterations have been made in order to avoid any possibility of misinterpretation.

One name which has been added to the list of contributors will give particular pleasure to all British readers. It is that of Professor Manley, and one might hope that this addition will remedy the habit of omitting reference to the works of those engaged on histological and embryological research on the oral tissues in the Schools of the British Isles.

The standard of publication remains high, as indeed it should, for the price of this book has now risen to three guineas. This might well persuade those who already have a copy not to purchase the new edition.

To those who are not familiar with this book it can be strongly recommended, and even the man who regards himself solely as a clinician will find stimulation within its covers. The tedium of his daily operating may well be replaced by a new enthusiasm if he reads this very readable book. B. W.

REMOVAL OF NAME

The name of Robert Karl Gunlack, of 276 Haydons Road, Wimbledon, S.W.19, has been ordered to be removed from any dental list in which it is now included. The name may not be included in future in any dental list unless the Tribunal or the Minister so directs.

OFFICIAL SUPPLEMENT OF THE
SURGICAL INSTRUMENT MANUFACTURERS' ASSOCIATION (INC.)
DENTAL LABORATORIES SECTION
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Editorial Committee: D. M. BEAUCHAMP; H. J. POTTER, F.I.B.S.T.

EDITORIAL

THE overdue report of the proceedings at the first meeting in Paris, on May 16, of the International Union of Dental Laboratories is now made, and displays the desire of those taking part and those who sent messages of goodwill to raise as much as possible the scientific, cultural, and technical level of dental laboratory personnel, and to develop between them and the associations of dental surgeons a spirit of collaboration and mutual understanding.

INTERNATIONAL UNION OF DENTAL LABORATORIES

M. ANDRÉ DROUHIN, president of the French national association, in his opening speech—here greatly contracted—traced the growth of the dental laboratory industry as an auxiliary to the dental profession, and referred to the mistrust of our development; although this mistrust was shown to depend on baseless fears, nevertheless a slur had been cast upon our honour. It was our wish that the rights of the surgeon should be respected, but that we in our turn should be also respected. We ourselves were mainly responsible, for we had resigned ourselves, and left to others the benefits wrought by our energies, skills, and techniques. Professional honesty, capability, and correct behaviour towards others were priceless.

It is not for the State to organize us, it is not for us to rise against authority. Our aim should be to enlighten the legislative powers of our respective countries, stating precisely what can be done to control access to our profession, and avoid illegal practice.

By fair dealing and honest and loyal procedures we must gain the sympathy of all interested in our problems, so as to win the esteem and respect of all. "Gentlemen . . . you are to-day laying the foundations . . . of an international federation . . . you are honourable . . . you may be proud."

M. Perrot, the secretary of the French association, then called the roll of the organizations attending. These were the Fédération Nationale de la Prothèse Dentaire (France), the Union Nationale des Laboratoires de Prothèse Dentaire (Belgium), the Sindicato Nazionale Odontotecnici (Italy), and the Dental Laboratories Section, S.I.M.A. (Great Britain). He then read apologies and letters of sympathy from countries which were unable to send delegates—the United States of America, Israel, and Sweden.

Jean Oosterbosch, Belgian provisional secretary, interposed to announce that in a recent letter, Mr. R. J. Rothstein, president of the National Association of Dental Laboratories of America, had asked for the closing paragraph of his letter to be read to the assembly:—

"Your congress in Paris will be followed by all, and I hope you will inform me of the

ensuing developments, as I impatiently await the day when an international organization of dental laboratories will gain a footing, and will encircle the civilized world. There is much to gain by exchanging ideas and a move in this direction will be beneficial to all. I wish you success and send to all the members of the assembly my greetings."

Then followed the nominations: M. Drouhin was proposed as chairman, the assembly approved, and M. Drouhin accepted the office; Messrs. Beauchamp, Oosterbosch, R. Perrot, and Gérard Tarquin were invited to seats by his side, as well as two scrutineers named by the chairman. The Italian delegates, Signori Martinazzi and Vare, asked not to be present on the rostrum, so as to facilitate the translation of their interventions.

The Chairman asked M. Oosterbosch to read the draft by-laws as follows:—

Draft of By-Laws for an International Union of Dental Laboratories

Article 1. *Name and Form of the Association.*—An international association was created in Paris on May 17, 1953, under the above name, and its by-laws were adopted by the duly appointed delegates of the following national organizations (here to be inserted a list of the national associations and their delegates).

2. *Head Office.*—The head office is to be in Paris. It may be transferred to another town in France upon decision of the board of directors.

3. *Aims.*—Excluding all profit-making aims, the purpose of the association is to defend the ethical and material interests of enterprises concerned with the manufacturing of apparatus for dental prosthesis, orthodonty, facial bone fractures, and generally all work executed in dental prosthesis laboratories.

To this end, it will: (*a*) establish and develop relations between the national associations of dental laboratories of the greatest number of countries possible; (*b*) raise as much as possible the scientific, cultural, and technical level of dental prosthesis personnel, and contribute to their professional perfecting; (*c*) develop and entertain good relations between associations of dental surgeons and those of prosthesis technicians, in a spirit of healthy collaboration and mutual understanding; (*d*) represent dental laboratories at international gatherings; (*e*) prepare or sponsor the organization of international congresses in countries of which the national associations are members; (*f*) set up commissions in charge of studying questions concerning dental laboratories; (*g*) encourage and record all initiative from whatever source, as well as excellence of workmanship, competitions, exhibitions, and other manifestations doing credit to the profession.

4. *Membership.*—The federation to be composed of three categories of members: 1st, Active; 2nd, Correspondence; 3rd, Honorary members.

5. *Active Members.*—All members of a national association of dental laboratories affiliated to the federation will be active members, with all the rights reserved to this category of membership.

6. *Accreditation.*—To be accredited by the federation, a national association must fulfil the following conditions: 1st, apply for affiliation to the general council of the international federation, provided that the associations designed under article 1, being considered as founders of the federation, are not obliged to fulfil this formality; 2nd, Have its application for affiliation signed by five members of its managing committee, including the chairman, secretary, and treasurer, and indicating the names and addresses of the signers; 3rd, Be admitted by the general meeting of the federation by a majority of votes of members present having the right to vote. The proposal for admission must necessarily figure on the agenda, following a favourable report by the general council.

7. *Correspondence Members* will be those wishing to join the federation personally, but whose national association has not requested affiliation because its geographical position would make it impossible to designate delegates to fulfil their mission. These correspondence members will not have the right to vote.

They must submit their candidature at least three months before the regular general meeting, and send the general council a copy

of the by-laws of the association of which they are members.

They will be accepted at the general meeting by a majority of the votes of the members present who have the right to vote. The proposal for admission must necessarily figure on the agenda, following a favourable report by the general council.

8. *Honorary Members.*—All those having rendered important services to their profession, and who are deserving of the recognition of the federation, may be admitted as honorary members.

Their admission in this capacity must be proposed by the general council at the general meeting of the federation, which will decide in the last instance by a two-thirds majority of votes of members present having the right to vote.

Honorary members will have the right to attend general meetings, but not the right to vote. They do not have to pay any dues.

9. *Loss of Membership.*—Active members as well as correspondence members will lose their membership and the right going with it in the following cases: (*a*) by resignation, addressed in writing to the secretary of the federation, at the latest, six months before the end of the year; (*b*) when the member retires or is excluded from his national association affiliated to the federation. In such a case, this national association must warn the secretary in writing of this retirement or exclusion at least six months before the expiry of the federation's business year. Should it fail to do so, the national association will have to pay the dues of this retired or excluded member; (*c*) by exclusion from the federation, decided by the general meeting by a majority of two-thirds of votes of members present having the right to vote. This exclusion may only be decided upon by the general council, if after the reading of a report it will have established the justification of measures to be taken, in case the member concerned has done something contrary to the general interest or honour of the profession or federation, by his writings, conduct, or in any other way.

10. *Dues.*—All active and correspondence members are to pay annual dues.

These dues are set at the general meeting for the year following the one in which they are set. They may be claimed as early as January 1. They are payable by the national association treasurers for active members. They are to be paid personally by correspondence members.

Each national association has the right to send to the general council proposals relative to dues. These proposals should, however, be sent, at the latest, three months before the date set for the general meeting.

The general council will decide whether the proposals are acceptable, and if necessary, submit them to the general meeting.

11. *General Meetings.*—The general meeting is the chief authority of the federation. It controls the management and policy of the general council, takes necessary decisions in view of the constitution of the general council and special commissions, as well as for the organization of congresses. It discusses the points listed on the agenda and approves or disapproves of proposals and reports submitted by the general council and special committees.

12. *Admission to General Meetings.*—The following are to be admitted with right to vote: (*a*) the retiring president; (*b*) actual delegates of affiliated national associations; (*c*) substitute delegates replacing actual delegates, either absent or appointed to the functions of president, secretary, or treasurer of the federation during the course of the session; (*d*) the president, secretary, and treasurer of the federation.

The following are to be admitted to the general meetings, but without the right to vote: (*a*) deputy delegates; (*b*) correspondence members; (*c*) honorary members; (*d*) members of special committees.

All members of national associations affiliated to the federation are to be admitted to the general meeting, but without the right to vote or take the floor: nevertheless, these members may be allowed by the president to take the floor, if they have so requested before the beginning of the session.

13. *Delegates.*—

a. Each national association affiliated to the federation has the right to appoint delegates

to represent it at the general meetings in conformity with the following provisions:

up to		500	members	2	actual delegates
from	500 to	1000	,,	3	,, ,,
,,	1000 to	5000	,,	4	,, ,,
,,	5000 to	10000	,,	5	,, ,,
more than		10000	,,	6	,, ,,

Each affiliated national association to have also the right to appoint the same number of deputy delegates, as they have actual delegates. The method for appointing these delegates may be decided freely by each national association. The federation will recognize as delegates only those bearing mandates signed by the president and secretary of their national association.

b. The president, secretary general, and the treasurer of the federation, although chosen from among the delegates, will not fulfil the functions of a delegate of their national association during their term of office. The national association of which they are members will have the right to appoint additional delegates to replace them.

c. Mandates appointing delegates and substitutes are valid for one year, as from the date of the regular general meeting. Their mandates may be renewed: they shall attend the special general meetings held during the period of their mandates.

d. When there are several national associations within one country, all affiliated to the federation, the sum of their members will indicate the number of delegates to be appointed, in accordance with the provisions indicated under (*a*) of this present article, but the general council will invite each of the national associations of the same country to appoint a number of delegates proportional to the number of its members.

14. Members having the right to vote have but one vote each. In case the votes are equally divided, that of the president will be decisive. Votes will be counted by raising hands, except in cases when secret balloting is requested before the beginning of the proceedings by ten persons having the right to vote.

15. *Sessions.*—

a. A regular general meeting will be held once a year, at the earliest eleven months, and at the latest sixteen months, after the preceding general meeting. General meetings are convened by the general council: convocations will be sent under sealed envelope to the national associations, as well as to actual delegates and deputies at least one month before the date of the meeting. Convocations will indicate the time, date, place, and agenda for the meetings.

b. One or several special general meetings may be called in between the sessions of the regular meetings, either upon the request of the president in compliance with the wishes expressed by five member associations, or upon decision of the general council in cases of emergency, or when ten national association members request it. In this latter case, the general council is obliged to convene the special general meeting, as requested.

16. *General Council.*—During the session at which the present by-laws are to be adopted, the general meeting will appoint a general council of the actual delegate members, except for the assistant secretary and treasurer, who need not be actual delegates, but who would not in such a case have the right to vote.

The general council will be composed of: (*a*) four counsellors elected from among the actual delegates; (*b*) eight directors of the federation; these directors are, the president of the federation, four vice-presidents, the secretary, the treasurer, and the chief editor.

The general meeting may also decide to appoint an assistant secretary and an assistant treasurer. The latter need not be delegates, and in such a case they would not have the right to vote.

17. *Duration of Mandates.*—The president to be elected for a term of two years. His mandate may be renewed. It may not, however, last more than six consecutive years. After this length of time his term of office must cease for at least a period of one year, after which he may again be elected as president.

The president to be elected by a special vote of the general meeting.

Beside the president, the meeting must appoint the other members of the general council. These eleven members will divide

among themselves the offices of vice-presidents (four), chief editor (one), secretary (one), treasurer (one), and counsellors (four).

The general meeting may then appoint an assistant secretary and an assistant treasurer. All the administrators and counsellors are to be elected for a period of two years, subject to the provisions under the first paragraph of this article concerning the president.

18. Half of the council is re-elected each year. For the first time, half of the retiring directors and counsellors will be up for re-election one year after the adoption of the present by-laws.

The following will retire and be up for re-election after the first year: The president, the treasurer, two vice-presidents chosen by ballot, two counsellors chosen by ballot, and possibly the assistant secretary.

19. Candidatures for the office of president or member of the general council must be sent in to the administrative secretary of the federation at least two weeks before the date of the general meeting having on its agenda the election of members of the general council or of the president. However, if no candidatures have been sent in for an office which has become vacant and for which the incumbent does not wish to run again, or is not re-eligible, candidatures may be presented during the election session.

20. The general council's duty is to carry out the resolutions adopted by the general meeting. It manages the federation in accordance with the by-laws and interior regulations.

21. *A Permanent Secretariat*, with a salaried personnel, will be formed by the general council. The secretary general will be in charge of managing and supervising this secretariat. He is responsible to the general council for the work of the personnel of the permanent secretariat.

22. *Commissions.*—Special Commissions will be formed at the general meeting each time it deems it necessary. The number, duration, and mission of these special commissions will be determined by the general assembly. These commissions will be consultative organizations. They do not enjoy the rights and prerogatives of national associations. When their mission is terminated, or periodically if necessary, they will make reports on their activities and submit them to the general council.

Persons called upon to serve on these commissions will, as much as possible, be chosen from among affiliated members of the federation. However, if the meeting deems it necessary, members of the commissions may be chosen in part from persons unconnected with the federation, or even with the profession, if they have some particular competence in the matters to be studied by the special commission on which they have been called to serve.

These commissions will be composed of at least three members, and at the most of seven members. They will choose their own chairman and vice-chairman from among their members. Members of special commissions are elected for a period of one year: their mandates may be renewed. Each special commission will draft its own internal regulations, which it will then submit for the approval of the general council.

23. *The French and English Languages* are to be the official languages adopted by the federation. In case of any difficulty in interpreting the by-laws and regulations, the French text will have priority. At general meetings and congresses, English, French, German, Italian, Spanish, and Dutch may be used. These languages are used in the federation's periodical publication.

24. *A Bi-lingual Periodical*, entitled "Le Laboratoire Dentaire: The Dental Laboratory" using the French and English languages, will appear every three months, to publish reports, news, and technical information of interest to dental laboratory owners. Summaries of the articles will be published in the other accepted languages.

25. *Balance Sheet and Statement* of detailed expenses will be submitted to the regular general meeting, together with an estimate for the coming financial year.

26. The Federation will arrange for an International Congress to be held under its name and patronage at least once every five years.

27. If international events should prevent the holding of a meeting or congress already decided upon, the meeting to be put off until the following year, or some later year, by decision of the general council, or if it fails to do so, by the president or whoever is deputizing for him.

28. In order to modify the by-laws, it shall be necessary: (*a*) that the modification be placed on the agenda sent with the convocations; (*b*) that two-thirds at least of the actual delegates be present at the meeting; and (*c*) that the modification be adopted by at least three-quarters of the delegates present having the right to vote. The same procedure is to be followed in the case of a proposal to dissolve the federation.

At this meeting, after the reading of the draft, a provisional council was appointed composed as follows: President, André Drouhin (France); vice-presidents, D. Martin Beauchamp (Great Britain), Gildo Martinazzi (Italy), Georges Hutsebaut (Belgium); secretary, Jean Oosterbosch (Belgium); treasurer, Gilbert Robin (France); counsellors, Eric G. Emmett (Great Britain), Riccardo Nodari, (Italy), Roger Duvaudié, Gaston Levet, and André Seghettini (France); assistant secretary, R. Perrot (France).

NEWS FROM HEAD OFFICE

A.G.M. and Dinner-Dance.—The Annual General Meeting of S.I.M.A. will take place at 6, Holborn Viaduct, E.C.1., on Friday, Oct. 9, at 1.30 p.m., and it is hoped that members of the Dental Laboratories Section will endeavour to be present. A report on the activities of the Section will be given by the Chairman, Mr. E. G. Emmett.

In the evening the Annual Dinner and Dance will be held at the Trocadero Restaurant, when Mr. H. Guy Drew will preside. The support of members of the Dental Laboratories Section will again be welcomed and we feel sure that those who avail themselves of this opportunity of meeting members not only of their own but other sections of the Association in a social atmosphere will spend a happy and enjoyable evening. Tickets are obtainable from Head Office, price 37s. 6d. each.

N.J.C. Constitution.—The revised edition of the N.J.C. Constitution is now available and copies are being sent to all our members.

DENTAL EDUCATION IN MAIDSTONE

For the third succeeding year the Maidstone and District Dental Technicians' Association (U.S.D.A.W.) has arranged an attractive winter course of demonstrations and lectures, for the benefit of all connected with dentistry who are able to attend. Dental surgeons, technicians in private practices, hospitals, and trade houses, and S.I.M.A. members are all co-operating. We congratulate chairman J. Johnson and his colleagues for their past altruistic endeavours, experience of which assures supporters of profitable and interesting meetings in the Technical College Lecture Theatre, Westree Rd., Maidstone.

Tuesday, Sept. 8, 7.30: E. A. Dennison, Mouth Anatomy and Tooth Carving; Saturday, Sept. 26, 3.0: L. H. Johnson, Orthodontic Fixed Appliances; Tuesday, Oct. 13, 7.30: K. Houghton, Cold Curing Acrylics and Copper Forming; Saturday, Oct. 31, 3.0: R. S. Fain, Swaged Metal Work; Tuesday, Nov. 10, 7.30: P. G. R. King, Contouring, Stippling, and Tinting Dentures; Saturday, Nov. 28, 3.0: Davis, Schottlander, & Davis, Croform Technique; Tuesday, Dec. 8, 7.30: W. K. Roberts, L.D.S. R.C.S., Muscle Actions in Orthodontics and Prosthetics.

1954.—Saturday, Jan, 9, 3.0: E. M. Natt, Porcelain Inlays, Crown and Bridge Work; Tuesday, Jan. 26, 7.30: C. Ash, Sons & Co., Selected Films; Saturday, Feb. 13, 3.0: British Dental Golds, Ltd., Gold Casting Techniques; Tuesday, Mar. 2, 7.30: D. F. Glass, L.D.S. R.C.S., Design and Function of Orthodontic Spring Attachments; Saturday, Mar. 27, 3.0: F. E. Martin, F.I.B.S.T., Rhodium Plating and the Development of the Articulator.